



New England Bioassay

A Division of GZA



NEW ENGLAND BIOASSAY A DIVISION OF GZA CHRONIC AQUATIC TOXICITY TEST REPORT

Permittee: Pine Brook Country Club NPDES # MA0032212
Report submitted to: 42 Newton Street
Weston, MA 02493
Sample ID: Effluent
Test Month/Year: October 2019
NEB Proj # 05.0752101.00

Test Type / Method: *Ceriodaphnia dubia* Modified Chronic Static-Renewal Freshwater
Test Method 1002.0; EPA 821-R-02-013
Pimephales promelas Modified Chronic Static-Renewal Freshwater
Test Method 1000.0; EPA 821-R-02-013

Effluent Sample Dates: #1 10/20-21/19 #2 10/22-23/19 #3 10/24-25/19

Test Start Date: 10/22/19

Results Summary

Your results were as follows:

Passed all permit limits

Acute Test Results

Species	LC50	A-NOEC	Permit Limit	Pass / Fail
<i>Ceriodaphnia dubia</i>	>100%	100%	≥ 100%	Pass
<i>Pimephales promelas</i>	>100%	100%	≥ 100%	Pass

Chronic Test Results

Species	C-NOEC	C-LOEC	IC25	Permit Limit	Pass/Fail
<i>Ceriodaphnia dubia</i>	100%	>100%	>100%	≥ 25%	Pass
<i>Pimephales promelas</i>	100%	>100%	>100%	≥ 25%	Pass

Data Qualifiers affecting this test:

Certifications & Approvals: NH ELAP (2071), NJ DEP (CT405)

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Test Report Certification

Permittee name: Pine Brook Country Club Permit number: MA0032212
Client sample ID: Effluent Test Start Date: 10/22/19

Whole Effluent Toxicity Test Report Certification (Permittee)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____
(Date) Authorized Signature _____

Print or Type Name and Title

Print or Type the Permittee's Name

MA0032212

Print or Type the NPDES Permit Number

Whole Effluent Toxicity Test Report Certification (Bioassay Laboratory)

The results reported relate only to the samples submitted as received

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Executed on: _____

11/13/19
(Date)



Kimberly Wills

Laboratory Manager

New England Bioassay a division of GZA

General Test Conditions

Permittee name Pine Brook Country Club Permit number: MA0032212
Client sample ID Effluent Test Start Date: 10/22/19

Sample Collection Information

Effluent #1 Dates/Times: 10/20-21/19 @ 1353-0822 Receiving Water #1 Date/Time: 10/21/19 @ 0845
Effluent #2 Dates/Times: 10/22-23/19 @ 1501-0830 Receiving Water #2 Date/Time: 10/23/19 @ 0900
Effluent #3 Dates/Times: 10/24-25/19 @ 1734-0703 Receiving Water #3 Date/Time: 10/25/19 @ 0747

Were a minimum of three samples collected? Yes ☒ No ☐ *(see note below)

Were samples used within the first 36 hours of collection? Yes ☒ No ☐ * (see note below)

* sample collection note:

Test Conditions

Permittee's Receiving Water: Pine Brook

Ceriodaphnia dubia

- Dilution water: Laboratory synthetic soft water (hardness 45 - 55 mg/L CaCO₃)
- Control water: Receiving water collected at a point immediately upstream of or away from the discharge

Pimephales promelas

- Dilution water: Laboratory synthetic soft water (hardness 45 - 55 mg/L CaCO₃)
- Control water: Receiving water collected at a point immediately upstream of or away from the discharge

Effluent concentrations tested: 0%, 6.25%, 12.5%, 25%, 50%, 100%

Was effluent salinity adjusted? No ☒ Yes ☐ with Instant Ocean sea salts to _____ ppt

Dechlorination procedures: Chlorine is measured using 4500 CL-G DPD Colorimetric Method

- Dechlorination was not required

Aeration: Did Dissolved Oxygen levels fall below 40% saturation? Yes ☐ No ☒

Test Aerated at <100 bubbles/minute as of: N/A (for Fathead minnow test only)

TRC results and further information about aeration of samples can be found attached in "sample receipt chemistry"

Reference Toxicant Data

Ceriodaphnia dubia

Date: 10/1/19

Toxicant: Sodium chloride

Dilution Water: NEB CTRMH

Organism Source: NEB

Reproduction IC₂₅: 1.02 g/L

Results within range Yes ☒ No ☐

Fathead minnows

Date: 10/29/19

Toxicant: Sodium chloride

Dilution Water: NEB Soft Water

Organism Source: NEB

Growth IC₂₅: 1.35 g/L

Results within range Yes ☒ No ☐

Ceriodaphnia dubia Test Results

Permittee name: Pine Brook Country Club Permit number: MA0032212
 Client sample ID: Effluent Test Dates: 10/22/19 - 10/28/19

Test Acceptability Criteria

Lab Diluent Survival: 90 % Mean Lab Diluent Reproduction: 24.2 young per female
 Brook Control Survival: 100 % Mean Brook Control Reproduction: 26.2 young per female
 Thiosulfate Control Survival: N/A % Mean Thiosulfate Control Reproduction: N/A young per female

Presence of an asterisk (*) indicates EPA criteria was not met, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Results

		Permit Limit	Test Result	Pass/Fail Status
Acute Data	48 hr LC50	≥ 100%	>100%	Pass
	48 hr NOEC		100%	
	TUa			
Chronic Data	Chronic LC50		>100%	
	Survival C-NOEC		100%	
	Survival C-LOEC		>100%	
	Reproduction C-NOEC		100%	
	Reproduction C-LOEC		>100%	
	Reproduction IC25		>100%	
	Reproduction IC50		>100%	
	Reportable C-NOEC	≥ 25%	100%	Pass
	Reportable C-LOEC		>100%	
	MATC		>100%	
	TUc			

Presence of an asterisk (*) indicates qualified data, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Variability

Reproduction PMSD: 28.4% Upper & Lower EPA bounds: 13 - 47% ☐ Low ☒ Within bounds ☐ High

- ☐ PMSD exceeds upper bounds. Test results are highly variable and may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC)
- ☒ The PMSD falls within the upper (47%) and lower (13%) bounds. Results are reportable.
- ☐ PMSD falls below the lower bound test variability criterion. The test is very sensitive. The relative percent difference (RPD) between the control and each treatment was calculated and compared to the lower bound.
- ☐ The RPD values for all concentrations fall below the lower bound. Any differences observed in this test are considered statistically insignificant.
- ☐ Some of the concentrations that were flagged as statistically significant have RPD values that fall below the lower bound. Any differences observed in these concentrations will not be considered statistically significantly decreased from the control.
- ☐ No statistically significant reductions were observed in this test.

***Ceriodaphnia dubia* Test Results**

Permittee name: Pine Brook Country Club Permit number: MA0032212
Client sample ID: Effluent Test Dates: 10/22/19 - 10/28/19

Concentration - Response Evaluation

Survival: #12 No significant effects at any test concentration with a flat concentration-response curve. Test concentrations performed very similarly to dilution control.

Reproduction: #13 No significant effects at any test concentration with a relatively flat concentration-response curve. Test concentrations performed equal to or better than the dilution control.

The concentration - response relationship was reviewed and the following determination was made:

Survival	Reproduction	
<u>X</u>	<u>X</u>	Results are reliable and reportable
<u> </u>	<u> </u>	Results are anomalous (see explanation below)
<u> </u>	<u> </u>	Results are inconclusive - retest (see explanation below)

Results Discussion (if applicable):

Pimephales promelas Test Results

Permittee name: Pine Brook Country Club Permit number: MA0032212
 Client sample ID: Effluent Test Dates: 10/22/19 - 10/29/19

Test Acceptability Criteria

Lab Diluent Survival: 100 % Mean Lab Diluent Growth: 0.50 mg
 Brook Control Survival: 72.5 % * Mean Brook Control Growth: 0.35 mg
 Thiosulfate Control Survival: N/A % Mean Thiosulfate Control Growth: N/A mg
 Presence of an asterisk (*) indicates EPA criteria was not met, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Results

		Permit Limit	Test Result	Pass/Fail Status
Acute Data	48 hr LC50	≥ 100%	>100%	Pass
	48 hr NOEC		100%	
	TUa			
Chronic Data	Chronic LC50		>100%	
	Survival C-NOEC		100%	
	Survival C-LOEC		>100%	
	Growth C-NOEC		100%	
	Growth C-LOEC		>100%	
	Growth IC25		>100%	
	Growth IC50		>100%	
	Reportable C-NOEC	≥ 25%	100%	Pass
	Reportable C-LOEC		>100%	
	MATC		>100%	
	TUc			

Presence of an asterisk (*) indicates qualified data, see explanation in the "Results Discussion" section at the bottom of the following page.

Test Variability

- Growth PMSD: 11.1% Upper & Lower EPA bounds: 12 - 30% ☒ Low ☐ Within bounds ☐ High
- ☐ PMSD exceeds upper bounds. Test results are highly variable and may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC)
- ☐ The PMSD falls within the upper (30%) and lower (12%) bounds. Results are reportable.
- ☒ PMSD falls below the lower bound test variability criterion. The test is very sensitive. The relative percent difference (RPD) between the control and each treatment was calculated and compared to the lower bound.
- ☐ The RPD values for all concentrations fall below the lower bound. Any differences observed in this test are considered statistically insignificant.
- ☐ Some of the concentrations that were flagged as statistically significant have RPD values that fall below the lower bound. Any differences observed in these concentrations will not be considered statistically significantly decreased from the control.
- ☒ No statistically significant reductions were observed in this test.

***Pimephales promelas* Test Results**

Permittee name: Pine Brook Country Club Permit number: MA0032212

Client sample ID: Effluent Test Dates: 10/22/19 - 10/29/19

Concentration - Response Evaluation

Survival: #12 No significant effects at any test concentration with a flat concentration-response curve.
Test concentrations performed very similarly to dilution control.

Growth: #12 No significant effects at any test concentration with a relatively flat concentration-response curve. Test concentrations performed both above and below (but similarly to) the dilution control.

The concentration - response relationship was reviewed and the following determination was made:

Survival	Growth	
<u>X</u>	<u>X</u>	Results are reliable and reportable
<u> </u>	<u> </u>	Results are anomalous (see explanation below)
<u> </u>	<u> </u>	Results are inconclusive - retest (see explanation below)

Results Discussion (if applicable):

Please note that survival of fish in the brook control screened concurrently with the effluent was 72.5% at test completion which is below the EPA minimum acceptability criterion of $\geq 80\%$ survival in controls. Since the brook was not used as the test dilution water, it caused no adverse effect on the outcome of the test.

TEST METHODS

Ceriodaphnia dubia

Test type:	Modified Chronic Static Renewal Freshwater Test
Test Reference Manual:	EPA-821-R-02-013 "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms"
Test Method:	<i>Ceriodaphnia dubia</i> Survival and Reproduction Test - EPA 1002.0
Temperature:	25 °C ± 1 °C (Temperatures should not deviate by more than 3 °C during the test) (required)
Light Quality:	Ambient Laboratory Illumination (recommended)
Light Intensity:	10-20 µE/m ² /s, or 50-100 ft-c (recommended)
Photoperiod:	16 hours light, 8 hours dark (recommended)
Test chamber size:	30 mL (recommended minimum)
Test solution volume:	15 mL (recommended minimum)
Renewal of Test Solutions:	Daily (required)
Age of Test Organisms:	Less than 24 hours; and all released within a 8-h period (required)
Number of Neonates Per Test Chamber:	1 Assigned using blocking by known parentage (required)
Number of Replicate Test Chambers Per Treatment:	10 (required minimum)
Number of Neonates Per Test Concentration:	10 (required minimum)
Feeding Regime:	Fed 0.1 mL each of YCT and algal suspension per exposure chamber daily. (recommended)
Cleaning:	Use new plastic cups daily (recommended)
Aeration:	None (recommended)
Test Duration:	Until 60% or more of control females have three broods (maximum test duration 8 days) (required)
Endpoints:	Survival and reproduction (required)
Test Acceptability:	80% or greater survival of all control organisms and an average of 15 or more young per surviving female in the control solutions. 60% of surviving control females must produce three broods. (required)
Sampling Requirements:	Minimum of three samples with a maximum holding time of 36 hours before first use. (required)
Sample volume required:	1 L/Day (recommended)

Pimephales promelas

Test type:	Modified Chronic Static Renewal Freshwater Test
Test Reference Manual:	EPA-821-R-02-013 "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms"
Test Method:	<i>Pimephales promelas</i> Survival and Growth Test - EPA 1000.0
Temperature:	25 °C ± 1 °C (Temperatures should not deviate by more than 3 °C during the test) (required)
Light Quality:	Ambient Laboratory Illumination (recommended)
Light Intensity:	10-20 µE/m ² /s, or 50-100 ft-c (recommended)
Photoperiod:	16 hours light, 8 hours dark (recommended)
Test chamber size:	600 mL (500 mL is recommended minimum)
Test solution volume:	250 mL (recommended minimum)
Renewal of Test Solutions:	Daily (required)
Age of Test Organisms:	Newly hatched larvae less than 24 hours old (required)
Number of Organisms Per Test Chamber:	10 (recommended)
Number of Replicate Test Chambers Per Treatment:	4 (required minimum)
Number of Organisms Per Test Concentration:	40 (required minimum)
Feeding Regime:	Feed 0.15 g of a concentrated suspension of newly hatched brine shrimp nauplii twice daily, 6 h between feedings (at the beginning of the work day prior to renewal, and at the end of the work day following renewal). Sufficient <i>Artemia</i> are added to provide an excess.
Cleaning:	Siphoned daily, immediately before test solution renewal (required)
Aeration:	None, unless DO concentration falls below 4.0 mg/L, at which point the rate should not exceed 100 bubbles/minute. (recommended)
Test Duration:	7 days (required)
Endpoints:	Survival and growth (weight) (required)
Test Acceptability:	80% or greater survival in controls; average dry weight per surviving organism in control chambers equals or exceeds 0.25 mg (required)
Sampling Requirements:	Minimum of three samples with a maximum holding time of 36 hours before first use. (required)
Sample volume required:	2.5 L/Day (recommended)

CERIODAPHNIA DUBIA DATASHEETS & STATISTICAL ANALYSIS

NEW ENGLAND BIOASSAY TOXICITY DATA FORM

CHRONIC COVER SHEET

CLIENT: Pine Brook Country Club
 ADDRESS: 42 Newton Street
Weston, MA 02193
 PERMITTEE: Pine Brook Country Club
 PERMIT NUMBER: MA0032212
 DILUTION WATER: Laboratory Soft Water

C.dubia TEST ID # 19-1508a
 CHAIN OF CUSTODY # C39-3895/96
 NEB PROJECT # 05.0752101.00
 SAMPLE ID: Effluent

INVERTEBRATES

TEST SET-UP TECHNICIAN: CH
 TEST SPECIES: *Ceriodaphnia dubia*
 NEB LOT # Cd19 (RMH 241)
 AGE: < 24 hours
 TEST SOLUTION VOLUME (mls): 15
 ORGANISMS PER TEST CHAMBER: 1
 ORGANISMS PER CONCENTRATION: 10

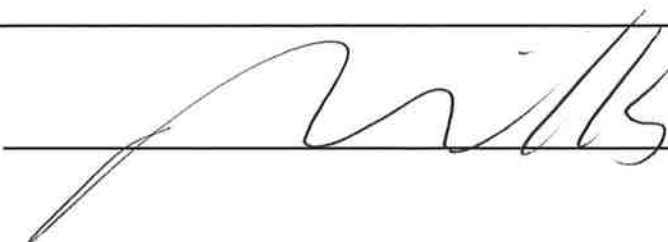
LABORATORY CONTROL WATER (SRCF)

Lot Number	Hardness mg/L CaCO ₃	Alkalinity mg/L CaCO ₃
C39-S025	46	30

	DATE	TIME
TEST START:	10/22/19	1403
TEST END:	10/28/19	1320

COMMENTS:

REVIEWED BY:



DATE:

11/13/19

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS: Pine Brook Country Club, 42 Newton Street, Weston MA 02193			
NEB PROJECT NUMBER: 05.0752101.00		NEB TEST NUMBER: 19-1508a	COC # C39-3895/96
TEST ORGANISM: <i>Ceriodaphnia dubia</i>		AGE: <24 hours	Lot # Cd19 (RMH 241)
START DATE: 10/22/19	TIME: 1403	END DATE: 10/28/19	TIME: 1320

Effluent Concentration	Culture Lot# Cd19 (RMH 241)											Total Live Young	# Live Adults	Analyst- Transfer	Analyst- Counts	
	Cup #	A1	A2	A3	A4	A7	A8	A9	A10	A11	A12					
	Day Number	Replicate														
		A	B	C	D	E	F	G	H	I	J					
NEB Lab Diluent	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	CH		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	PD		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10	CH		
	3	5	7	✓	✓	5	6	5	4	✓	6	38	10	PD	PD	
	4	9	12	5	✓	✓	✓	✓	✓	6	10	42	10	PD	PD	
	5	✓	✓	8	3	9	9	8	9	8	✓	54	10	PD	PD	
	6	16	16	11	9	✓/x	10	11	8	10	17	108	9	KO	KO	
	7															
	totals	30	35	24	12	14	25	24	21	24	33	242	9			MC
Pine Brook Control		A	B	C	D	E	F	G	H	I	J					
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10			
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10			
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10			
	3	6	7	5	7	6	8	7	6	6	5	63	10			
	4	✓	7	✓	10	6	1	10	9	✓	5	48	10			
	5	✓	✓	8	✓	✓	11	✓	✓	6	✓	25	10			
	6	15	19	2	16	11	11	14	15	12	11	126	10			
	7															
totals	21	33	15	33	23	31	31	30	24	21	262	10				
6.25%		A	B	C	D	E	F	G	H	I	J					
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10			
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10			
	2	✓	✓	✓	✓	✓	✓	✓	✓/x	✓	✓	0	9			
	3	7	7	3	6	6	4	6	X	5	5	49	9			
	4	11	8	✓	✓	8	✓	9	X	7	11	54	9			
	5	✓	✓	7	9	✓	8	✓	X	✓	✓	24	9			
	6	10	18	13	10	11	15	11	X	10	15	113	9			
	7															
	totals	28	33	23	25	25	27	26	0	22	31	240	9			

Notes: AE = aborted eggs noted

NEW ENGLAND BIOASSAY - CHRONIC TOXICITY TEST BROOD DATA SHEET

FACILITY NAME & ADDRESS: Pine Brook Country Club, 42 Newton Street, Weston MA 02193
 NEB PROJECT NUMBER: 05.0752101.00 ORGANISM: *Ceriodaphnia dubia* START DATE: 10/22/19

Effluent Concentration	Day Number	Replicate										Total Live Young	# Live Adults		
		A	B	C	D	E	F	G	H	I	J				
12.5%	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	5	5	5	6	5	6	5	5	5	7	54	10		
	4	7	5	✓	✓	8	1	✓	✓	✓	10	31	10		
	5	✓	✓	9	8	✓	3/x	10	8	6	✓	44	9		
	6	22	19	12	14	8	X	10	7	12	14	118	9		
	7														
	totals	34	29	26	28	21	10	25	20	23	31	247	9		
25%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	6	7	5	6	6	7	6	6	5	5	59	10		
	4	12	10	✓	✓	8	8	✓	8	✓	9	55	10		
	5	✓	✓	6	7	✓	✓	8	✓	8	✓	29	10		
	6	21	16	13	11	13	13	7	10	9	AE/x	113	9		
	7														
	totals	39	33	24	24	27	28	21	24	22	14	256	9		
50%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	6	6	✓	✓	4	6	6	7	6	6	47	10		
	4	11	9	6	4	8	✓	10	✓	7	12	67	10		
	5	✓	✓	8	8	✓	10	✓	7	✓	✓	33	10		
	6	17	19	12	10	12	12	9	11	13	12	127	10		
	7														
	totals	34	34	26	22	24	28	25	25	26	30	274	10		
100%		A	B	C	D	E	F	G	H	I	J				
	0	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	0	10		
	3	5	7	5	5	6	5	4	6	6	6	55	10		
	4	10	11	✓	✓	8	✓	✓	✓	✓	10	39	10		
	5	✓	✓	10	7	✓	8	9	8	11	✓	53	10		
	6	14	19	11	13	10	6	10	13	13	14	123	10		
	7														
	totals	29	37	26	25	24	19	23	27	30	30	270	10		

CETIS Analytical Report

Report Date: 31 Oct-19 14:52 (p 1 of 6)
Test Code/ID: 19-1508a / 00-2747-3077

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: 13-0336-4959	Endpoint: 2d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 31 Oct-19 14:51	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 06-2552-5195	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 22 Oct-19 14:03	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 28 Oct-19 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 5d 23h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 05-6543-1214	Code: 21B3CBAE	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 30h	Client: Pine Brook Country Club	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	1322695	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

2d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.25		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.98	2.0%
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.98	2.0%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.98	2.0%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.98	2.0%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.98	2.0%

2d Survival Rate Detail

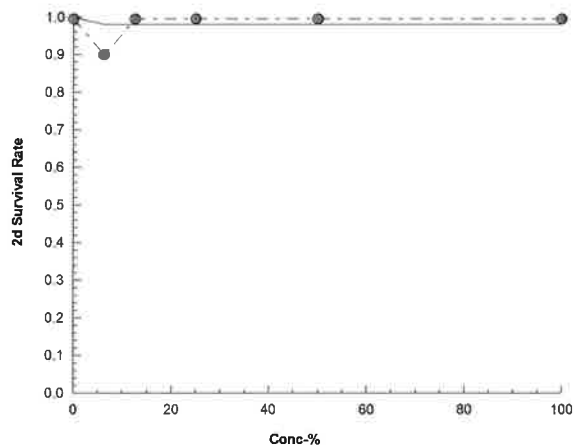
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

2d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test			New England Bioassay
Analysis ID: 13-0336-4959	Endpoint: 2d Survival Rate	CETIS Version: CETISv1.9.4	
Analyzed: 31 Oct-19 14:51	Analysis: Linear Interpolation (ICPIN)	Status Level: 1	

Graphics



CETIS Analytical Report

Report Date: 31 Oct-19 14:52 (p 3 of 6)
Test Code/ID: 19-1508a / 00-2747-3077

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: 18-5122-5858	Endpoint: 6d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 31 Oct-19 14:51	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 06-2552-5195	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 22 Oct-19 14:03	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 28 Oct-19 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 5d 23h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 05-6543-1214	Code: 21B3CBAE	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 30h	Client: Pine Brook Country Club	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	1705390	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

6d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	10	0.9000	0.0000	1.0000	0.3162	35.14%	0.0%	9/10	0.9333	0.0%
6.25		10	0.9000	0.0000	1.0000	0.3162	35.14%	0.0%	9/10	0.9333	0.0%
12.5		10	0.9000	0.0000	1.0000	0.3162	35.14%	0.0%	9/10	0.9333	0.0%
25		10	0.9000	0.0000	1.0000	0.3162	35.14%	0.0%	9/10	0.9333	0.0%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	-11.11%	10/10	0.9333	0.0%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	-11.11%	10/10	0.9333	0.0%

6d Survival Rate Detail

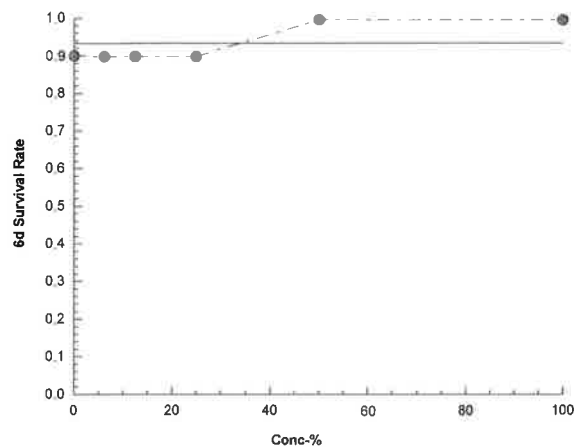
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test			New England Bioassay
Analysis ID:	18-5122-5858	Endpoint:	6d Survival Rate
Analyzed:	31 Oct-19 14:51	Analysis:	Linear Interpolation (ICPIN)
		CETIS Version:	CETISv1.9.4
		Status Level:	1

Graphics



CETIS Analytical Report

Report Date: 31 Oct-19 14:52 (p 1 of 2)
Test Code/ID: 19-1508a / 00-2747-3077

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: 03-7440-6400	Endpoint: 6d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 31 Oct-19 14:51	Analysis: STP 2xK Contingency Tables	Status Level: 1
Batch ID: 06-2552-5195	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 22 Oct-19 14:03	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 28 Oct-19 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 5d 23h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 05-6543-1214	Code: 21B3CBAE	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 30h	Client: Pine Brook Country Club	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	n/a	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Group	Test Stat	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	0.7632	Exact	1.0000	Non-Significant Effect
		12.5	0.7632	Exact	1.0000	Non-Significant Effect
		25	0.7632	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	D	9	1	10	0.9	0.1	0.0%
6.25		9	1	10	0.9	0.1	0.0%
12.5		9	1	10	0.9	0.1	0.0%
25		9	1	10	0.9	0.1	0.0%
50		10	0	10	1	0	-11.11%
100		10	0	10	1	0	-11.11%

6d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

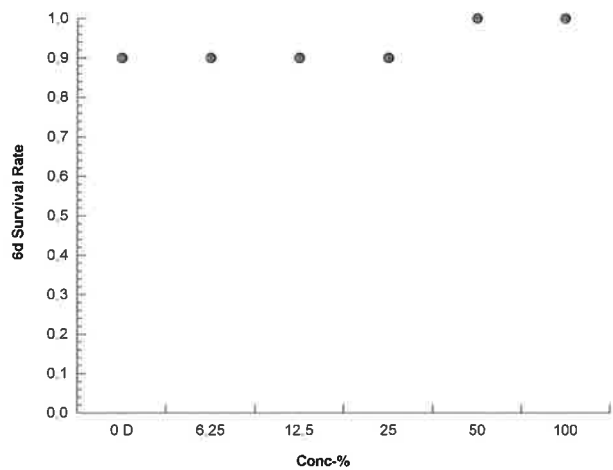
6d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test New England Bioassay

Analysis ID:	03-7440-6400	Endpoint:	6d Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	31 Oct-19 14:51	Analysis:	STP 2xK Contingency Tables	Status Level:	1

Graphics



CETIS Analytical Report

Report Date: 31 Oct-19 14:53 (p 1 of 2)
Test Code/ID: 19-1508a / 00-2747-3077

Ceriodaphnia 7-d Survival and Reproduction Test

New England Bioassay

Analysis ID: 02-9814-5618	Endpoint: Reproduction	CETIS Version: CETISv1.9.4
Analyzed: 31 Oct-19 14:53	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Batch ID: 06-2552-5195	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 22 Oct-19 14:03	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 28 Oct-19 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 5d 23h	Taxon: Branchiopoda	Source: In-House Culture Age: <24
Sample ID: 05-6543-1214	Code: 21B3CBAE	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 30h	Client: Pine Brook Country Club	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	>100	n/a	1	28.38%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	111.5	75	2	18	Asymp	0.9403	Non-Significant Effect
		12.5	107	75	2	18	Asymp	0.8746	Non-Significant Effect
		25	108	75	4	18	Asymp	0.8923	Non-Significant Effect
		50	122	75	3	18	Asymp	0.9941	Non-Significant Effect
		100	117	75	3	18	Asymp	0.9803	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	24.2	15	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	104.483	20.8967	5	0.4643	0.8011	Non-Significant Effect
Error	2430.5	45.0093	54			
Total	2534.98		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.654	15.09	0.2477	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9421	0.9459	0.0067	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	10	24.2	18.91	29.49	24	12	35	2.337	30.54%	0.00%
6.25		10	24	17.5	30.5	25.5	0	33	2.871	37.83%	0.83%
12.5		10	24.7	19.86	29.54	25.5	10	34	2.14	27.40%	-2.07%
25		10	25.6	20.72	30.48	24	14	39	2.156	26.63%	-5.79%
50		10	27.4	24.48	30.32	26	22	34	1.293	14.92%	-13.22%
100		10	27	23.5	30.5	26.5	19	37	1.549	18.14%	-11.57%

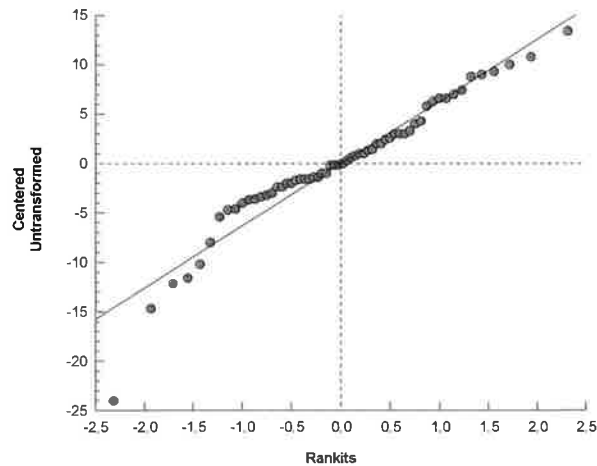
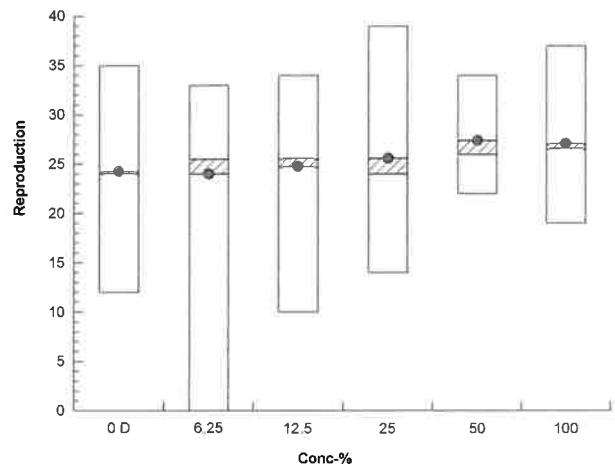
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	30	35	24	12	14	25	24	21	24	33
6.25		28	33	23	25	25	27	26	0	22	31
12.5		34	29	26	28	21	10	25	20	23	31
25		39	33	24	24	27	28	21	24	22	14
50		34	34	26	22	24	28	25	25	26	30
100		29	37	26	25	24	19	23	27	30	30

Ceriodaphnia 7-d Survival and Reproduction Test New England Bioassay

Analysis ID:	02-9814-5618	Endpoint:	Reproduction	CETIS Version:	CETISv1.9.4
Analyzed:	31 Oct-19 14:53	Analysis:	Nonparametric-Control vs Treatments	Status Level:	1

Graphics



CETIS Analytical Report

Report Date: 31 Oct-19 14:53 (p 1 of 2)
Test Code/ID: 19-1508a / 00-2747-3077

Ceriodaphnia 7-d Survival and Reproduction Test				New England Bioassay	
Analysis ID: 18-5034-9007	Endpoint: Reproduction	CETIS Version: CETISv1.9.4			
Analyzed: 31 Oct-19 14:53	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Batch ID: 06-2552-5195	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 22 Oct-19 14:03	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 28 Oct-19 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 5d 23h	Taxon: Branchiopoda	Source: In-House Culture		Age: <24	
Sample ID: 05-6543-1214	Code: 21B3CBAE	Project:			
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)			
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:			
Sample Age: 30h	Client: Pine Brook Country Club				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	702725	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

		TAC Limits		Overlap	Decision
Attribute	Test Stat	Lower	Upper		
Control Resp	24.2	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

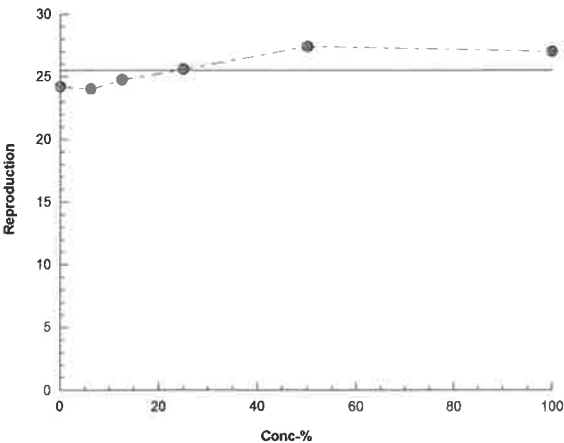
		Calculated Variate							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	D	10	24.2	12	35	7.391	30.54%	0.0%	25.48	0.0%
6.25		10	24	0	33	9.08	37.83%	0.83%	25.48	0.0%
12.5		10	24.7	10	34	6.767	27.40%	-2.07%	25.48	0.0%
25		10	25.6	14	39	6.818	26.63%	-5.79%	25.48	0.0%
50		10	27.4	22	34	4.088	14.92%	-13.22%	25.48	0.0%
100		10	27	19	37	4.899	18.14%	-11.57%	25.48	0.0%

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	D	30	35	24	12	14	25	24	21	24	33
6.25		28	33	23	25	25	27	26	0	22	31
12.5		34	29	26	28	21	10	25	20	23	31
25		39	33	24	24	27	28	21	24	22	14
50		34	34	26	22	24	28	25	25	26	30
100		29	37	26	25	24	19	23	27	30	30

Ceriodaphnia 7-d Survival and Reproduction Test		New England Bioassay	
Analysis ID: 18-5034-9007	Endpoint: Reproduction	CETIS Version: CETISv1.9.4	
Analyzed: 31 Oct-19 14:53	Analysis: Linear Interpolation (ICPIN)	Status Level: 1	

Graphics



NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDRESS:		Pine Brook Country Club, 42 Newton Street, Weston MA 02193						
NEB PROJECT NUMBER:		05.0752101.00			TEST ORGANISM		<i>Ceriodaphnia dubia</i>	
DILUTION WATER SOURCE:		Laboratory Soft Water			START DATE:		10/22/19 TIME: 1403	
ANALYST	LS	BA	CH	LS	KO	KO		
NEB Lab Diluent	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.7	25.3	25.2	25.0	25.4	25.4		
D.O. mg/L Initial	8.3	8.2	8.4	8.4	8.3	8.3		
pH s.u. Initial	7.5	7.3	7.2	7.4	7.5	7.2		
Conductivity µS Initial	177	175	175	177	177	177		
Temp °C Final	24.1	24.4	24.1	25.1	24.2	24.8		
D.O. mg/L Final	8.3	8.3	8.3	8.5	8.3	8.2		
pH s.u. Final	7.6	7.2	7.3	7.8	7.7	7.2		
Conductivity µS Final	188	194	186	188	201	196		
Pine Brook Control	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.8	24.7	24.0	24.5	26.0	25.7		
D.O. mg/L Initial	9.1	9.1	9.9	9.3	9.1	8.9		
pH s.u. Initial	7.0	7.1	7.0	7.3	7.3	6.9		
Conductivity µS Initial	351	348	319	321	353	352		
Temp °C Final	24.3	24.5	24.1	25.2	24.4	24.8		
D.O. mg/L Final	8.2	8.2	8.2	8.3	8.2	8.2		
pH s.u. Final	7.6	7.2	7.2	7.7	7.6	7.2		
Conductivity µS Final	366	373	337	334	365	379		
6.25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	25.2	25.2	25.1	25.3	25.5		
D.O. mg/L Initial	8.3	8.3	8.3	8.3	8.3	8.2		
pH s.u. Initial	7.2	7.3	7.2	7.5	7.5	7.1		
Conductivity µS Initial	221	220	218	223	222	220		
Temp °C Final	24.3	24.6	24.1	25.3	24.4	25.0		
D.O. mg/L Final	8.2	8.1	8.3	8.3	8.1	8.2		
pH s.u. Final	7.6	7.3	7.3	7.8	7.6	7.2		
Conductivity µS Final	237	238	232	233	239	242		
12.5%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	25.2	25.2	25.2	25.3	25.6		
D.O. mg/L Initial	8.3	8.2	8.4	8.3	8.3	8.2		
pH s.u. Initial	7.2	7.3	7.2	7.5	7.5	7.2		
Conductivity µS Initial	264	263	264	268	262	258		
Temp °C Final	24.3	24.6	24.0	25.3	24.5	24.9		
D.O. mg/L Final	8.2	8.2	8.3	8.3	8.1	8.2		
pH s.u. Final	7.6	7.3	7.3	7.8	7.6	7.2		
Conductivity µS Final	277	274	276	275	275	277		

[illegible]

Brood mother source: AB (10⁸) A-7 Source's brood size: 18 (Qty.)

Pine Brook 10-22-19

Tech	At	At	At	At		MC	At	KF								
Date	10-15	10-16	10-17	10-18		10-20	10-21	10-22								
Day acc.	0	1	2	3	4	5	6	7		8	9	10	11	12	13	14
Cup #																
1	N	N	N	N		2B 12	N	Y ₁₉ ^{T1}	1							
2	N	N	N	N		2B 14	N	Y ₁₉ ^{T2}	2							
3	N	N	N	N		2B 8	N	Y ₁₁₀ ^{T3}	3							
4	N	N	N	N		2B 10	N	Y ₁₅ ^{T4}	4							
5	N	N	N	N		2B 11	N	Y	5							
6	N	N	N	N		2B 12	N	Y	6							
7	N	N	N	N		2B 16	N	Y ₁₅ ^{T5}	7							
8	N	N	N	N		2B 10	N	Y ₁₃ ^{T6}	8							
9	N	N	N	N		2B 12	N	Y ₁₈ ^{T7}	9							
10	N	N	N	N		2B 13	N	Y ₁₆ ^{T8}	10							
11	N	N	N	N		2B 13	N	Y ₁₅ ^{T9}	11							
12	N	N	N	N		2B 10	N	Y ₁₆ ^{T10}	12							
13	N	N	N	N		2B 15	N	Y	13							

Y = neonates present, and criterion has been met: ≥ 20 neonates produced in total by 3rd brood.

N = no neonates

2B = two broods present. 2Y = two broods and criterion met: ≥ 20 neos. by 3rd brood.

X = brood mother dead ae = aborted eggs

✓ or P = neonates present after renewal on previous day (see time in log).

A → = acceptable for acute testing only

T# = neonates used in test, replicate number of test noted (and brood counted).

acc. = if acclimated, H₂O type used w/ renewal this day.

Test organism collection:

Tray diagram
used?

Project #	Symbols (✓ / P)	(Y/N)	Time period, neonates released	Collection date / time
0752101	T	Y	10-21-19/1700 → 10-21-19/1850	10-22-19/1115
	T			
	T			
	T			
	T			
	T			

Table of Random Permutations of 16

C.dubia Test ID#

19-1508a

7	12	15	15	1	2	7	16	10	2	14	15	7	13	13	10	6	1	8	10
13	3	8	16	7	10	11	10	13	5	11	7	13	16	7	7	5	13	2	14
3	1	4	5	14	13	3	14	9	13	13	2	9	15	6	2	8	4	5	8
11	8	16	14	15	6	2	6	2	16	8	5	12	3	9	13	4	3	10	4
14	9	1	6	3	9	14	13	8	6	5	8	14	7	3	15	13	11	4	7
2	16	10	13	5	5	13	2	11	7	3	12	5	14	12	16	2	2	9	15
4	6	13	7	2	15	1	9	1	4	7	10	6	9	11	9	7	6	16	11
6	14	6	10	4	14	4	15	3	3	4	16	2	6	5	1	12	10	6	9
10	15	2	1	13	12	16	3	4	8	10	1	15	5	14	12	14	12	3	2
12	10	7	12	9	11	9	8	12	14	15	4	11	8	16	8	9	14	14	1
15	7	5	2	10	7	8	12	6	15	6	13	16	12	15	4	11	8	12	6
16	2	11	8	8	8	15	5	16	1	1	9	8	1	8	14	16	5	13	5
9	13	14	3	6	4	10	11	5	12	9	3	10	4	4	3	10	9	1	3
8	11	9	4	11	3	12	7	7	10	12	14	3	10	1	6	15	16	15	12
1	5	12	11	16	16	5	4	14	9	16	11	1	2	10	5	1	15	7	13
5	4	3	9	12	1	6	1	15	11	2	6	4	11	2	11	3	7	11	16
11	8	16	5	5	13	1	13	2	16	14	12	9	8	7	5	13	3	13	3
2	2	8	8	14	16	4	3	8	11	10	14	15	1	2	11	4	5	15	9
6	13	2	13	6	5	9	15	11	10	12	6	16	15	16	9	10	12	16	15
14	12	4	16	16	11	14	10	5	12	3	3	12	14	15	13	6	4	1	16
8	6	3	9	4	10	6	4	16	2	2	9	8	16	4	6	5	15	7	8
9	15	12	10	3	2	12	6	1	15	4	13	7	7	9	12	14	8	8	11
3	10	11	12	13	12	5	11	7	8	9	5	14	11	10	1	3	13	3	5
16	1	13	14	8	14	15	5	3	7	11	15	6	12	5	7	11	1	14	4
1	14	14	2	9	15	16	14	6	14	7	8	3	13	11	8	7	7	12	7
4	4	6	4	12	3	11	8	15	9	8	1	13	6	3	3	15	9	9	12
15	5	1	11	10	6	3	7	10	5	5	11	10	10	12	15	16	14	5	2
5	3	5	6	7	7	13	2	14	3	16	4	5	5	13	4	9	16	2	6
12	7	15	15	15	9	8	12	12	13	15	10	1	4	6	16	2	6	11	1
10	11	10	3	2	4	2	1	4	6	6	7	11	9	14	10	8	11	4	13
7	9	7	7	11	1	7	16	13	1	13	2	4	2	1	2	12	2	10	14
13	16	9	1	1	8	10	9	9	4	1	16	2	3	8	14	1	10	6	10
1	6	7	4	8	6	5	2	conc	15	4	6	6	1	4	5	7	reps	2	10
9	15	11	3	11	15	9	10	8	3	8	2	15	7	9	8	16	1	14	3
10	16	4	5	12	9	16	11	7	1	7	16	11	8	3	3	12	2	3	4
4	14	1	9	5	5	4	13	6	8	15	5	12	5	7	16	5	11	8	1
7	3	13	14	15	2	1	14	16	5	14	9	2	16	1	12	6	14	4	13
16	11	2	1	14	16	6	9	3	4	16	14	3	15	11	11	3	9	12	5
3	10	16	16	13	7	13	1	11	14	9	10	16	2	10	2	10	7	10	16
11	13	9	13	4	13	8	3	5	13	10	12	5	12	5	14	13	16	5	6
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14	1	14	6	10	1	3	12	4	2	2	4	13	3	16	9	9	3	7	14
13	12	5	11	3	11	15	8	2	7	11	7	8	14	6	4	4	4	15	11
12	5	10	7	2	14	7	15	14	16	13	1	9	10	12	10	11	10	9	8
8	9	8	10	6	4	11	7	10	11	6	8	4	9	8	15	8	6	11	9
2	7	6	2	1	8	10	6	15	12	1	11	7	11	13	6	1	15	13	15
6	4	15	8	16	10	14	16	9	6	12	3	10	6	14	7	2	12	16	7
5	8	12	15	7	3	12	5	12	9	5	15	1	13	15	13	15	5	1	2
13	4	10	4	16	13	16	13	5	3	6	14	1	16	8	7	2	3	3	12
5	14	4	6	8	2	15	1	13	14	16	4	15	4	3	12	12	1	4	7
2	2	2	15	14	16	9	12	16	6	10	15	14	9	10	1	14	8	8	16
7	12	15	8	12	3	5	14	7	12	5	13	16	1	7	5	11	2	9	3
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11	6	6	1	4	1	3	16	12	5	4	9	13	13	6	8	15	9	1	14
4	10	3	16	2	11	7	9	6	9	1	8	4	11	5	2	16	10	12	4
1	8	1	13	1	15	4	4	11	4	2	16	5	8	1	9	5	12	16	6
9	7	14	2	6	4	14	10	9	8	15	10	7	10	9	10	6	14	10	11
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8	13	13	3	3	10	13	2	4	1	8	6	11	14	15	6	9	16	2	2
16	16	5	12	11	6	1	3	8	16	3	7	2	5	16	14	13	7	14	15

PIMEPHALES PROMELAS DATASHEETS & STATISTICAL ANALYSIS

NEW ENGLAND BIOASSAY TOXICITY DATA FORM
CHRONIC COVER SHEET

CLIENT: Pine Brook Country Club
ADDRESS: 42 Newton Street
Weston, MA 02193
PERMITTEE: Pine Brook Country Club
PERMIT NUMBER: MA0032212
DILUTION WATER: Laboratory Soft Water

P.promelas TEST ID # 19-1508b
CHAIN OF CUSTODY # C39-3895/96
NEB PROJECT # 05.0752101.00
SAMPLE ID: Effluent

VERTEBRATES

TEST SET-UP TECHNICIAN: LS
TEST SPECIES: *Pimephales promelas*
NEB LOT # Pp(10-22)
AGE: < 24 hours
TEST SOLUTION VOLUME (mls): 400
ORGANISMS PER TEST CHAMBER: 10
ORGANISMS PER CONCENTRATION: 40

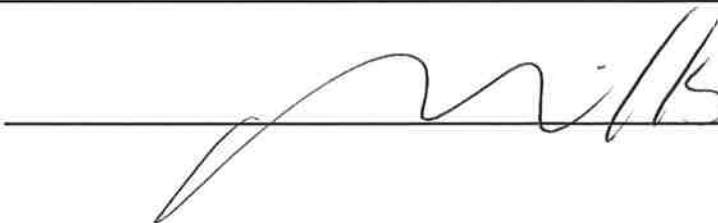
LABORATORY CONTROL WATER (SRCF)

Lot Number	Hardness mg/L	Alkalinity mg/L
C39-S025	46	30

	DATE	TIME
TEST START:	10/22/19	1335
TEST END:	10/29/19	1315

COMMENTS:

REVIEWED BY:



DATE:

11/13/19

**NEB'S SURVIVAL DATA SHEET FOR FATHEAD MINNOW LARVAL
SURVIVAL AND GROWTH TEST**

FACILITY NAME & ADDRESS:		Pine Brook Country Club, 42 Newton Street, Weston MA 02193							
NEB PROJECT NUMBER:		05.0752101.00		TEST NUMBER:		19-1508b		COC # C39-3895/96	
TEST ORGANISM:		<i>Pimephales promelas</i>		AGE:		<24 hours		Lot # Pp(10-22)	
START DATE:		10/22/19		TIME:		1335		END DATE: 10/29/19 TIME: 1315	

Effluent Concentration	Replicate Number	Number of Survivors								
		Day								
		0	1	2	3	4	5	6	7	Remarks
	ANALYST	LS	BA	CH	LS	PD	KO	CW	LS	
NEB Lab Synthetic Diluent	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
Pine Brook Control	A	10	10	10	9	9	9	9	9	
	B	10	10	9	2	0	0	0	0	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
6.25%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	9	9	9	9	
	D	10	10	10	10	10	10	10	10	
12.5%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
25%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
50%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	10	10	10	
100%	A	10	10	10	10	10	10	10	10	
	B	10	10	10	10	10	10	10	10	
	C	10	10	10	10	10	10	10	10	
	D	10	10	10	10	10	9	9	9	

D.O. concentration fell below 4.0 mg/L, all concentrations were aerated at <100 bubbles/minute as of:

NEW ENGLAND BIOASSAY OBSERVATION DATA FORM

Permittee: Pine Brook Country Club Test Species: *Pimephales promelas* Test ID: 19-1508b
 Date: 10/22/19 Project # 05.0752101.00

All organisms appear healthy and normal unless noted									
Concentration or Dilution	Day	2	Observations	Date:	10/24/19	Technician:	CH		
Lab Diluent	Rep A:		Rep B:		Rep C:		Rep D:		
Brook Control	Rep A:		Rep B:	F	Rep C:		Rep D:		
6.25%	Rep A:		Rep B:		Rep C:		Rep D:		
12.5%	Rep A:		Rep B:		Rep C:		Rep D:		
25%	Rep A:		Rep B:		Rep C:		Rep D:		
50%	Rep A:		Rep B:		Rep C:		Rep D:		
100%	Rep A:		Rep B:		Rep C:		Rep D:		
	Day	3	Observations	Date:	10/25/19	Technician:	LS		
Lab Diluent	Rep A:		Rep B:		Rep C:		Rep D:		
Brook Control	Rep A:		Rep B:	F	Rep C:		Rep D:		
6.25%	Rep A:		Rep B:		Rep C:		Rep D:		
12.5%	Rep A:		Rep B:		Rep C:		Rep D:		
25%	Rep A:		Rep B:		Rep C:		Rep D:		
50%	Rep A:		Rep B:		Rep C:		Rep D:		
100%	Rep A:		Rep B:		Rep C:		Rep D:		

F= fungus NF = no fungus SL = slightly lethargic L = lethargic VL = very lethargic TD = tangled in debris MT = missing test organism
 TE = technician error (organism accidentally killed by technician) SS = stuck in surface tension DW = dead above water line

NEW ENGLAND BIOASSAY OBSERVATION DATA FORM

Permittee: Pine Brook Country Club Test Species: *Pimephales promelas* Test ID: 19-1508b
 Date: 10/22/19 Test Date: 10/22/19 Project # 05.0752101.00

Concentration or Dilution		All organisms appear healthy and normal unless noted									
		Day	4	Observations	Date:	10/26/19	Technician:	PD			
Lab Diluent	Rep A:			Rep B:			Rep C:			Rep D:	
Brook Control	Rep A:			Rep B:	F		Rep C:			Rep D:	
6.25%	Rep A:			Rep B:			Rep C:	MT		Rep D:	
12.5%	Rep A:			Rep B:			Rep C:			Rep D:	
25%	Rep A:			Rep B:			Rep C:			Rep D:	
50%	Rep A:			Rep B:			Rep C:			Rep D:	
100%	Rep A:			Rep B:			Rep C:			Rep D:	
		Day		Observations	Date:		Technician:				
Lab Diluent	Rep A:			Rep B:			Rep C:			Rep D:	
Brook Control	Rep A:			Rep B:			Rep C:			Rep D:	
6.25%	Rep A:			Rep B:			Rep C:			Rep D:	
12.5%	Rep A:			Rep B:			Rep C:			Rep D:	
25%	Rep A:			Rep B:			Rep C:			Rep D:	
50%	Rep A:			Rep B:			Rep C:			Rep D:	
100%	Rep A:			Rep B:			Rep C:			Rep D:	

F= fungus NF = no fungus SL = slightly lethargic L = lethargic VL = very lethargic TD = tangled in debris MT = missing test organism
 TE = technician error (organism accidentally killed by technician) SS = stuck in surface tension DW = dead above water line

NEW ENGLAND BIOASSAY WEIGHT DATA FOR FATHEAD MINNOW LARVAL SURVIVAL AND GROWTH TEST

FACILITY NAME & ADDRESS:		Pine Brook Country Club, 42 Newton Street, Weston MA 02193	
NEB PROJECT #	05.0752101.00	NEB TEST NUMBER:	19-1508b
TEST START DATE	10/22/19	WEIGHING DATE:	11/13/19
TEST END DATE	10/29/19		
DRYING TEMPERATURE (°C)	100 ± 4	DRYING TIME:	minimum 6 hours
ANALYST-INITIAL WEIGHTS	BA	ANALYST-FINAL WEIGHTS	MC
Effluent Concentration	Replicate Number	A Weight of boat (mg)	B Dry Weight: Foil and Larvae (mg)
NEB Lab Synthetic Diluent	A	931.07	936.51
	B	937.06	941.39
	C	939.51	944.48
	D	931.92	937.05
Pine Brook Control	A	916.37	920.72
	B	927.85	N/A
	C	917.71	922.37
	D	915.38	920.48
6.25%	A	934.52	939.59
	B	935.20	940.49
	C	929.38	934.76
	D	927.75	932.86
12.5%	A	927.26	932.56
	B	924.97	930.41
	C	926.30	931.40
	D	930.83	936.24
25%	A	925.17	929.91
	B	917.60	922.48
	C	919.72	925.02
	D	934.97	940.20
50%	A	929.52	935.15
	B	928.91	933.29
	C	930.25	935.61
	D	927.08	932.23
100%	A	924.12	929.41
	B	923.66	929.07
	C	919.68	925.11
	D	921.28	926.55

CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 1 of 6)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 10-3864-0679	Endpoint: 2d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 13 Nov-19 13:21	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 08-3155-4291	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Oct-19 13:35	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Oct-19 13:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 07-5262-7935	Code: 2CDC30DF	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 29h	Client: Pine Brook Country Club	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	227445	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

2d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
6.25		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
12.5		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
25		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
50		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
100		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%

2d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

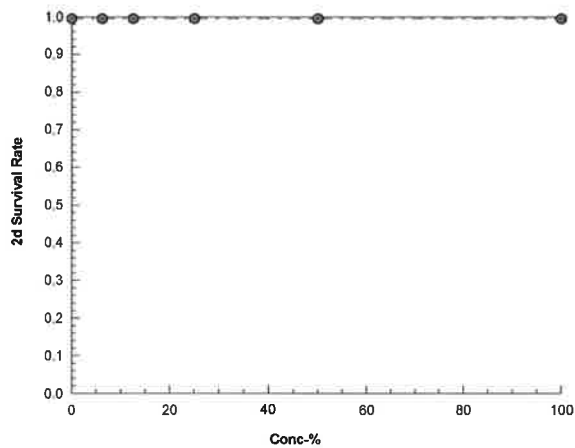
2d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Fathead Minnow 7-d Larval Survival and Growth Test New England Bioassay

Analysis ID:	10-3864-0679	Endpoint:	2d Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	13 Nov-19 13:21	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1

Graphics



CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 3 of 6)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 05-6497-3641	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 13 Nov-19 13:22	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 08-3155-4291	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Oct-19 13:35	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Oct-19 13:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 07-5262-7935	Code: 2CDC30DF	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 29h	Client: Pine Brook Country Club	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X)	Linear	362717	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	D	4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	1	0.0%
6.25		4	0.9750	0.9000	1.0000	0.0500	5.13%	2.5%	39/40	0.9937	0.63%
12.5		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	0.9937	0.63%
25		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	0.9937	0.63%
50		4	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	40/40	0.9937	0.63%
100		4	0.9750	0.9000	1.0000	0.0500	5.13%	2.5%	39/40	0.975	2.5%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9000

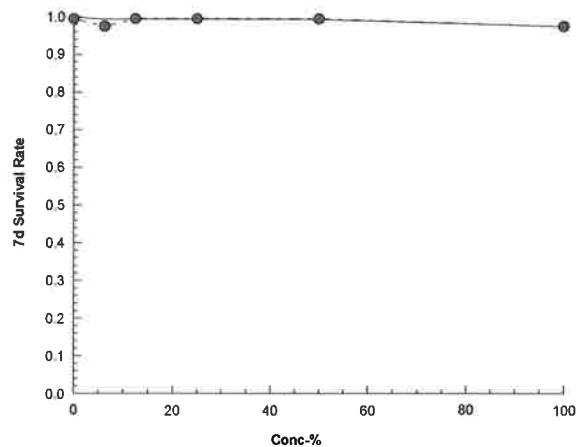
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	10/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	10/10

Fathead Minnow 7-d Larval Survival and Growth Test New England Bioassay

Analysis ID:	05-6497-3641	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	13 Nov-19 13:22	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1

Graphics



CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 5 of 6)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 11-4088-9154	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4
Analyzed: 13 Nov-19 13:22	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Batch ID: 08-3155-4291	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Oct-19 13:35	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Oct-19 13:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 07-5262-7935	Code: 2CDC30DF	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 29h	Client: Pine Brook Country Club	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	591024	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
Control Resp	0.4967	Lower 0.25	Upper >>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC25	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Mean Dry Biomass-mg Summary

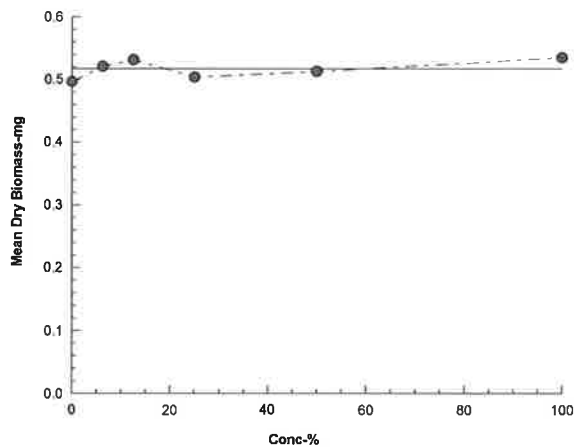
			Calculated Variate						Isotonic Variate	
Conc.-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	D	4	0.4967	0.433	0.544	0.04676	9.41%	0.0%	0.5168	0.0%
6.25		4	0.5212	0.507	0.538	0.01471	2.82%	-4.93%	0.5168	0.0%
12.5		4	0.5313	0.51	0.544	0.01539	2.90%	-6.95%	0.5168	0.0%
25		4	0.5038	0.474	0.53	0.02704	5.37%	-1.41%	0.5168	0.0%
50		4	0.513	0.438	0.563	0.05372	10.47%	-3.27%	0.5168	0.0%
100		4	0.535	0.527	0.543	0.008167	1.53%	-7.7%	0.5168	0.0%

Mean Dry Biomass-mg Detail

Conc.-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.544	0.433	0.497	0.513
6.25		0.507	0.529	0.538	0.511
12.5		0.53	0.544	0.51	0.541
25		0.474	0.488	0.53	0.523
50		0.563	0.438	0.536	0.515
100		0.529	0.541	0.543	0.527

Fathead Minnow 7-d Larval Survival and Growth Test			New England Bioassay
Analysis ID: 11-4088-9154	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4	
Analyzed: 13 Nov-19 13:22	Analysis: Linear Interpolation (ICPIN)	Status Level: 1	

Graphics



CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 1 of 4)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 20-5987-5108	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.4
Analyzed: 13 Nov-19 13:22	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Batch ID: 08-3155-4291	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Oct-19 13:35	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Oct-19 13:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 07-5262-7935	Code: 2CDC30DF	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 29h	Client: Pine Brook Country Club	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	C > T	100	>100	n/a	1	5.60%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	16	10	1	6	Asymp	0.6105	Non-Significant Effect
		12.5	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		25	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		50	18	10	1	6	Asymp	0.8333	Non-Significant Effect
		100	16	10	1	6	Asymp	0.6105	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0088531	0.0017706	5	0.8	0.5640	Non-Significant Effect
Error	0.039839	0.0022133	18			
Total	0.0486921		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.2	4.248	7.3E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	0.8	4.248	0.5640	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6154	0.884	9.2E-07	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		4	0.9750	0.8954	1.0000	1.0000	0.9000	1.0000	0.0250	5.13%	2.50%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
6.25		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%
12.5		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
25		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
50		4	1.412	1.412	1.412	1.412	1.412	1.412	0	0.00%	0.00%
100		4	1.371	1.242	1.501	1.412	1.249	1.412	0.04074	5.94%	2.89%

CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 2 of 4)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 20-5987-5108
Analyzed: 13 Nov-19 13:22

Endpoint: 7d Survival Rate
Analysis: Nonparametric-Control vs Treatments

CETIS Version: CETISv1.9.4
Status Level: 1

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9000

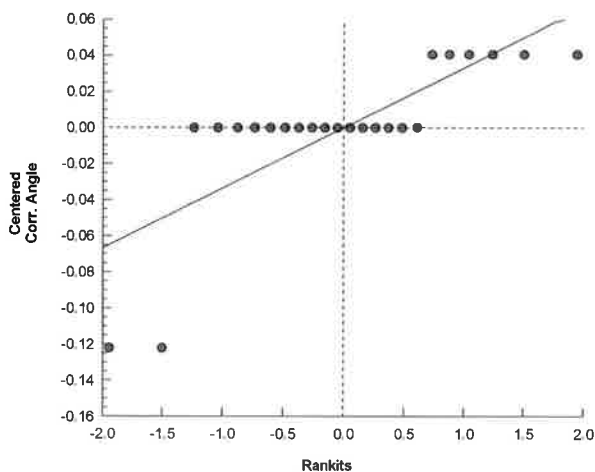
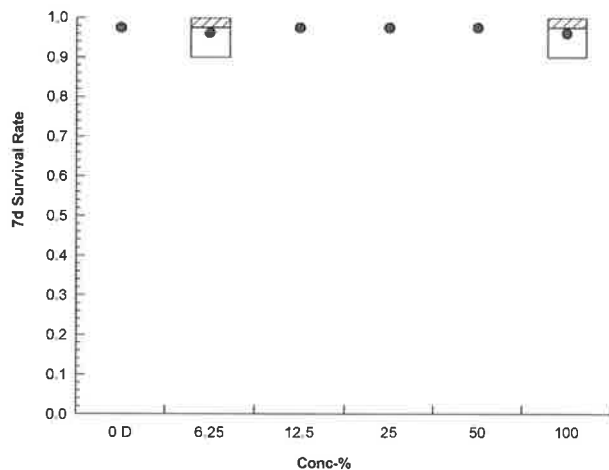
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	1.412	1.412	1.412	1.412
6.25		1.412	1.412	1.249	1.412
12.5		1.412	1.412	1.412	1.412
25		1.412	1.412	1.412	1.412
50		1.412	1.412	1.412	1.412
100		1.412	1.412	1.412	1.249

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	10/10	10/10	10/10	10/10
6.25		10/10	10/10	9/10	10/10
12.5		10/10	10/10	10/10	10/10
25		10/10	10/10	10/10	10/10
50		10/10	10/10	10/10	10/10
100		10/10	10/10	10/10	9/10

Graphics



CETIS Analytical Report

Report Date: 13 Nov-19 13:22 (p 3 of 4)
Test Code/ID: 19-1508b / 15-5205-7250

Fathead Minnow 7-d Larval Survival and Growth Test

New England Bioassay

Analysis ID: 18-9170-8476	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4
Analyzed: 13 Nov-19 13:22	Analysis: Parametric-Control vs Treatments	Status Level: 1
Batch ID: 08-3155-4291	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 22 Oct-19 13:35	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 29 Oct-19 13:15	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: In-House Culture Age: <24
Sample ID: 07-5262-7935	Code: 2CDC30DF	Project:
Sample Date: 21 Oct-19 08:22	Material: WWTF Effluent	Source: Pine Brook Country Club (MA0032212)
Receipt Date: 21 Oct-19 11:23	CAS (PC):	Station:
Sample Age: 29h	Client: Pine Brook Country Club	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C > T	100	>100	n/a	1	11.12%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Dilution Water		6.25	-1.067	2.407	0.055	6	CDF	0.9856	Non-Significant Effect
		12.5	-1.503	2.407	0.055	6	CDF	0.9959	Non-Significant Effect
		25	-0.305	2.407	0.055	6	CDF	0.9075	Non-Significant Effect
		50	-0.7078	2.407	0.055	6	CDF	0.9632	Non-Significant Effect
		100	-1.666	2.407	0.055	6	CDF	0.9975	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.4967	0.25	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0045860	0.0009172	5	0.8703	0.5201	Non-Significant Effect
Error	0.0189711	0.001054	18			
Total	0.0235571		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.86	15.09	0.0368	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9298	0.884	0.0963	Normal Distribution

Mean Dry Biomass-mg Summary

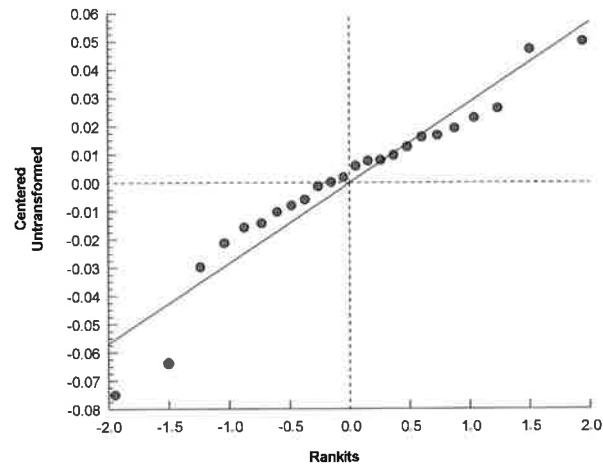
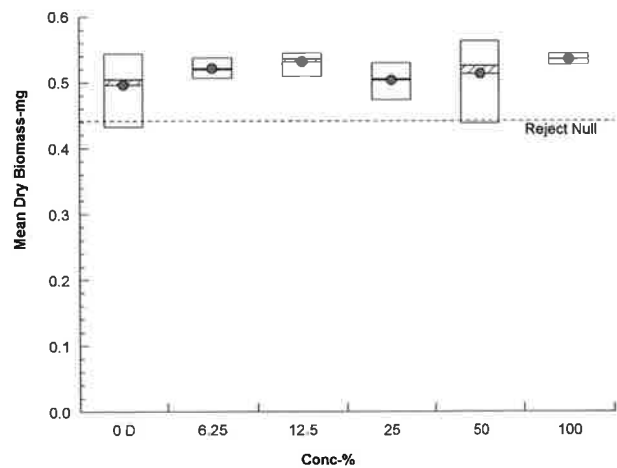
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	D	4	0.4967	0.4223	0.5712	0.505	0.433	0.544	0.02338	9.41%	0.00%
6.25		4	0.5212	0.4978	0.5446	0.52	0.507	0.538	0.007353	2.82%	-4.93%
12.5		4	0.5313	0.5068	0.5557	0.5355	0.51	0.544	0.007695	2.90%	-6.95%
25		4	0.5038	0.4607	0.5468	0.5055	0.474	0.53	0.01352	5.37%	-1.41%
50		4	0.513	0.4275	0.5985	0.5255	0.438	0.563	0.02686	10.47%	-3.27%
100		4	0.535	0.522	0.548	0.535	0.527	0.543	0.004084	1.53%	-7.70%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	D	0.544	0.433	0.497	0.513
6.25		0.507	0.529	0.538	0.511
12.5		0.53	0.544	0.51	0.541
25		0.474	0.488	0.53	0.523
50		0.563	0.438	0.536	0.515
100		0.529	0.541	0.543	0.527

Fathead Minnow 7-d Larval Survival and Growth Test			New England Bioassay	
Analysis ID:	18-9170-8476	Endpoint:	Mean Dry Biomass-mg	CETIS Version: CETISv1.9.4
Analyzed:	13 Nov-19 13:22	Analysis:	Parametric-Control vs Treatments	Status Level: 1

Graphics



Concentration	Rep	Final Weight (mg)	Initial Weight (mg)	Total Weight (mg)	Average per fish (mg)	Mean fish weight (mg)	Standard Deviation
NEB Lab Synthetic Diluent	1	936.51	931.07	5.44	0.544	0.4968	0.046764481
	2	941.39	937.06	4.33	0.433		
	3	944.48	939.51	4.97	0.497		
	4	937.05	931.92	5.13	0.513		
Pine Brook Control	1	920.72	916.37	4.35	0.435	0.3528	0.237171352
	2	0.00	0.00	0.00	0.000		
	3	922.37	917.71	4.66	0.466		
	4	920.48	915.38	5.10	0.510		
6.25%	1	939.59	934.52	5.07	0.507	0.5213	0.014705441
	2	940.49	935.20	5.29	0.529		
	3	934.76	929.38	5.38	0.538		
	4	932.86	927.75	5.11	0.511		
12.5%	1	932.56	927.26	5.30	0.530	0.5312	0.015392098
	2	930.41	924.97	5.44	0.544		
	3	931.40	926.30	5.10	0.510		
	4	936.24	930.83	5.41	0.541		
25%	1	929.91	925.17	4.74	0.474	0.5037	0.027035471
	2	922.48	917.60	4.88	0.488		
	3	925.02	919.72	5.30	0.530		
	4	940.20	934.97	5.23	0.523		
50%	1	935.15	929.52	5.63	0.563	0.5130	0.053721504
	2	933.29	928.91	4.38	0.438		
	3	935.61	930.25	5.36	0.536		
	4	932.23	927.08	5.15	0.515		
100%	1	929.41	924.12	5.29	0.529	0.5350	0.008164966
	2	929.07	923.66	5.41	0.541		
	3	925.11	919.68	5.43	0.543		
	4	926.55	921.28	5.27	0.527		

NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

FACILITY NAME & ADDRESS:		Pine Brook Country Club, 42 Newton Street, Weston MA 02193						
NEB PROJECT NUMBER:		05.0752101.00		TEST ORGANISM		<i>Pimephales promelas</i>		
DILUTION WATER SOURCE:		Laboratory Soft Water		START DATE:		10/22/19		TIME: 1335
ANALYST	LS	BA	CH	LS	KO	KO	CH	
NEB Lab Synthetic Diluent	1	2	3	4	5	6	7	Remarks
Temp °C Initial	24.7	25.3	25.2	25.0	25.4	25.4	25.5	
D.O. mg/L Initial	8.3	8.2	8.4	8.4	8.3	8.3	8.2	
pH s.u. Initial	7.5	7.3	7.2	7.4	7.5	7.2	7.6	
Conductivity µS Initial	177	175	175	177	177	177	177	
Temp °C Final	24.8	24.5	24.3	25.2	24.8	25.0	24.9	
D.O. mg/L Final	7.8	7.9	7.6	7.5	7.7	7.4	7.3	
pH s.u. Final	7.6	7.4	7.8	7.8	7.2	7.5	7.2	
Conductivity µS Final	182	200	200	188	191	193	191	
Pine Brook Control	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.8	24.7	24.0	24.5	26.0	25.7	26.0	
D.O. mg/L Initial	9.1	9.1	9.9	9.3	9.1	8.9	9.2	
pH s.u. Initial	7.0	7.1	7.0	7.3	7.3	6.9	7.4	
Conductivity µS Initial	351	348	319	321	353	352	353	
Temp °C Final	25.0	24.8	24.6	24.8	25.2	25.6	24.9	
D.O. mg/L Final	7.6	7.6	7.6	8.0	7.5	7.2	7.2	
pH s.u. Final	7.5	7.3	7.7	7.9	7.1	7.5	7.1	
Conductivity µS Final	350	374	351	336	365	369	370	
6.25%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	25.2	25.2	25.1	25.3	25.5	25.7	
D.O. mg/L Initial	8.3	8.3	8.3	8.3	8.3	8.2	8.2	
pH s.u. Initial	7.2	7.3	7.2	7.5	7.5	7.1	7.6	
Conductivity µS Initial	221	220	218	223	222	220	216	
Temp °C Final	24.7	24.5	24.4	25.1	24.6	24.8	24.7	
D.O. mg/L Final	7.8	7.8	7.5	7.5	7.7	7.4	7.3	
pH s.u. Final	7.5	7.3	7.6	7.8	7.2	7.5	7.2	
Conductivity µS Final	224	244	248	237	244	237	233	
12.5%	1	2	3	4	5	6	7	Remarks
Temp °C Initial	25.0	25.2	25.2	25.2	25.3	25.6	25.8	
D.O. mg/L Initial	8.3	8.2	8.4	8.3	8.3	8.2	8.2	
pH s.u. Initial	7.2	7.3	7.2	7.5	7.5	7.2	7.7	
Conductivity µS Initial	264	263	264	268	262	258	256	
Temp °C Final	25.0	24.4	24.3	24.9	24.9	25.3	24.7	
D.O. mg/L Final	7.6	7.6	7.5	7.6	7.7	7.3	7.3	
pH s.u. Final	7.5	7.3	7.5	7.7	7.2	7.5	7.2	
Conductivity µS Final	266	288	290	282	285	274	274	

NEB'S DATA SHEET FOR ROUTINE CHEMICAL AND PHYSICAL DETERMINATIONS

[illegible]

Table of Random Permutations of 16

P.promelas Test ID#

19-1508b

7	12	15	15	1	2	7	16	10	2	14	15	7	13	13	10	6	1	8	10
13	3	8	16	7	10	11	10	13	5	11	7	13	16	7	7	5	13	2	14
3	1	4	5	14	13	3	14	9	13	13	2	9	15	6	2	8	4	5	8
11	8	16	14	15	6	2	6	2	16	8	5	12	3	9	13	4	3	10	4
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2	16	10	13	5	5	13	2	11	7	3	12	5	14	12	16	2	2	9	15
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6	14	6	10	4	14	4	15	3	3	4	16	2	6	5	1	12	10	6	9
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12	10	7	12	9	11	9	8	12	14	15	4	11	8	16	8	9	14	14	1
15	7	5	2	10	7	8	12	6	15	6	13	16	12	15	4	11	8	12	6
16	2	11	8	8	8	15	5	16	1	1	9	8	1	8	14	16	5	13	5
9	13	14	3	6	4	10	11	5	12	9	3	10	4	4	3	10	9	1	3
8	11	9	4	11	3	12	7	7	10	12	14	3	10	1	6	15	16	15	12
1	5	12	11	16	16	5	4	14	9	16	11	1	2	10	5	1	15	7	13
5	4	3	9	12	1	6	1	15	11	2	6	4	11	2	11	3	7	11	16
11	8	16	5	5	13	1	13	2	16	14	12	9	8	7	5	13	3	13	3
2	2	8	8	14	16	4	3	8	11	10	14	15	1	2	11	4	5	15	9
6	13	2	13	6	5	9	15	11	10	12	6	16	15	16	9	10	12	16	15
14	12	4	16	16	11	14	10	5	12	3	3	12	14	15	13	6	4	1	16
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12	7	15	15	15	9	8	12	12	13	15	10	1	4	6	16	2	6	11	1
10	11	10	3	2	4	2	1	4	6	6	7	11	9	14	10	8	11	4	13
7	9	7	7	11	1	7	16	13	1	13	2	4	2	1	2	12	2	10	14
13	16	9	1	1	8	10	9	9	4	1	16	2	3	8	14	1	10	6	10
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10	16	4	5	12	9	16	11	7	1	7	16	11	8	3	3	12	2	3	4
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2	7	6	2	1	8	10	6	15	12	1	11	7	11	13	6	1	15	13	15
6	4	15	8	16	10	14	16	9	6	12	3	10	6	14	7	2	12	16	7
5	8	12	15	7	3	12	5	12	9	5	15	1	13	15	13	15	5	1	2
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5	14	4	6	8	2	15	1	13	14	16	4	15	4	3	12	12	1	4	7
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7	12	15	8	12	3	5	14	7	12	5	13	16	1	7	5	11	2	9	3
6	9	7	14	9	14	10	11	15	11	12	1	12	12	14	16	3	11	11	8
14	5	16	7	10	8	11	8	14	13	7	11	6	3	11	4	4	6	6	9
15	11	8	9	7	12	8	7	1	15	9	3	3	7	13	11	10	4	5	1
11	6	6	1	4	1	3	16	12	5	4	9	13	13	6	8	15	9	1	14
4	10	3	16	2	11	7	9	6	9	1	8	4	11	5	2	16	10	12	4
1	8	1	13	1	15	4	4	11	4	2	16	5	8	1	9	5	12	16	6
9	7	14	2	6	4	14	10	9	8	15	10	7	10	9	10	6	14	10	11
12	1	9	10	15	5	2	15	10	2	14	2	8	2	4	13	8	5	15	5
3	3	12	11	5	9	6	6	3	10	13	12	9	6	2	15	7	15	7	13
10	15	11	5	13	7	12	5	2	7	11	5	10	15	12	3	1	13	13	10
8	13	13	3	3	10	13	2	4	1	8	6	11	14	15	6	9	16	2	2
16	16	5	12	11	6	1	3	8	16	3	7	2	5	16	14	13	7	14	15

CHEMICAL ANALYSIS

Please note the subcontract laboratory has its own QAQC and data review processes, and therefore New England Bioassay does not review the analytical results we receive.



Friday, October 25, 2019

Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Project ID: PINE BROOK COUNTRY CLUB
SDG ID: GCE44716
Sample ID#s: CE44716 - CE44718

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

A handwritten signature in cursive script that reads "Phyllis Shiller".

Phyllis Shiller

Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 25, 2019

SDG I.D.: GCE44716

Project ID: PINE BROOK COUNTRY CLUB

Client Id	Lab Id	Matrix
EFFLUENT #1 C39-3895	CE44716	WASTE WATER
PINE BROOK #1 C39-3896	CE44717	WATER
EFF GRAB #1	CE44718	WASTE WATER



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 25, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: LB
Analyzed by: see "By" below

Date Time

10/21/19 8:22
10/21/19 16:56

Laboratory Data

SDG ID: GCE44716
Phoenix ID: CE44716

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFFLUENT #1 C39-3895

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.154	0.010	mg/L	1	10/23/19	TH	E200.7
Cadmium	< 0.0001	0.0001	mg/L	1	10/24/19	RS	SM3113B
Copper	0.0326	0.0010	mg/L	1	10/23/19	TH	E200.7
Hardness (CaCO ₃)	96.5	0.1	mg/L	1	10/23/19		SM2340B
Nickel	0.005	0.001	mg/L	1	10/23/19	TH	E200.7
Lead	< 0.0003	0.0003	mg/L	1	10/23/19	RS	SM3113B
Zinc	0.046	0.002	mg/L	1	10/23/19	TH	E200.7
Alkalinity-CaCO ₃	55.6	5.00	mg/L	1	10/21/19	AP/EG	SM2320B-11
Conductivity	745	5.00	umhos/cm	1	10/21/19	AP/EG	SM2510B-11
Ammonia as Nitrogen	< 0.05	0.05	mg/L	1	10/25/19	KDB	E350.1
Tot. Diss. Solids	520	10	mg/L	1	10/23/19	ARG/NLM	SM2540C-11
Tot. Org. Carbon	5.38	0.50	mg/L	1	10/22/19	EG	SM5310B-11
Total Solids	520	10	mg/L	1	10/23/19	NLM/BJA	SM2540B-11
Total Metals Digestion	Completed				10/22/19	AG	

B = Present in blank, no bias suspected.

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 25, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 25, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: LB
Analyzed by: see "By" below

Date Time

10/21/19 8:45
10/21/19 16:56

Laboratory Data

SDG ID: GCE44716
Phoenix ID: CE44717

Project ID: PINE BROOK COUNTRY CLUB
Client ID: PINE BROOK #1 C39-3896

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Aluminum	0.048	0.010	mg/L	1	10/23/19	TH	SW6010D/E200.7
Cadmium	< 0.0001	0.0001	mg/L	1	10/24/19	RS	SM3113B/SW7010-10
Copper	0.0016	0.0010	mg/L	1	10/23/19	TH	SW6010D/E200.7
Hardness (CaCO ₃)	52.8	0.1	mg/L	1	10/23/19		E200.7
Nickel	< 0.001	0.001	mg/L	1	10/23/19	TH	SW6010D/E200.7
Lead	< 0.0003	0.0003	mg/L	1	10/23/19	RS	SM3113B/SW7010
Zinc	0.004	0.002	mg/L	1	10/23/19	TH	SW6010D/E200.7
Alkalinity-CaCO ₃	38.9	5.00	mg/L	1	10/21/19	AP/EG	SM2320B-11
Conductivity	278	5.00	umhos/cm	1	10/21/19	AP/EG	SM2510B-11
Ammonia as Nitrogen	0.05	0.05	mg/L	1	10/25/19	KDB	E350.1
pH	6.65	1.00	pH Units	1	10/21/19 23:39	AP/EG	SM4500-H B-11
Tot. Org. Carbon	5.13	0.50	mg/L	1	10/22/19	EG	SM5310B-11
Total Metals Digestion	Completed				10/22/19	AG	

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 25, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 25, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: LB
Analyzed by: see "By" below

Date Time

10/21/19 8:31
10/21/19 16:56

Laboratory Data

SDG ID: GCE44716
Phoenix ID: CE44718

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFF GRAB #1

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	10/21/19 17:51	O	SM4500CLG-97
pH	6.93	1.00	pH Units	1	10/21/19 23:42	AP/EG	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 25, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 25, 2019

QA/QC Data

SDG I.D.: GCE44716

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 502737 (mg/L), QC Sample No: CE44710 (CE44716, CE44717)													
Cadmium - Water	BRL	0.0001	<0.0001	<0.0001	NC	110			111			75 - 125	20
QA/QC Batch 502737 (mg/L), QC Sample No: CE44710 (CE44716, CE44717)													
Lead (Furnace) - Water	BRL	0.001	<0.0003	<0.001	NC	110			117			75 - 125	30
QA/QC Batch 502750 (mg/L), QC Sample No: CE43989 (CE44716, CE44717)													
<u>ICP Metals - Aqueous</u>													
Aluminum	BRL	0.010	0.020	0.019	NC	103	102	1.0	104			75 - 125	20
Copper	BRL	0.0025	0.038	0.0416	9.00	104	103	1.0	106			75 - 125	20
Nickel	BRL	0.0005	0.003	0.0034	NC	105	104	1.0	107			75 - 125	20
Zinc	BRL	0.0020	0.103	0.104	1.00	103	103	0.0	104			75 - 125	20



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 25, 2019

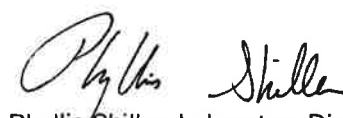
QA/QC Data

SDG I.D.: GCE44716

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 502859 (mg/L), QC Sample No: CE43643 (CE44716)													
Tot. Diss. Solids	13	10	300	290	3.40	96.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 502665 (mg/L), QC Sample No: CE44564 (CE44716, CE44717)													
Alkalinity-CaCO ₃	BRL	5.00	71	70	NC	99.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 502673 (umhos/cm), QC Sample No: CE44564 (CE44716, CE44717)													
Conductivity	BRL	5.00	304	319	4.80	90.5						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 502660 (pH), QC Sample No: CE44564 (CE44717, CE44718)													
pH			7.09	7.13	0.60	96.8						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 502860 (mg/L), QC Sample No: CE44637 (CE44716, CE44717)													
Total Organic Carbon	BRL	1.0	1.2	1.3	NC	96.0			98.0			85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 502932 (mg/L), QC Sample No: CE44716 (CE44716)													
Total Solids	BRL	10	520	520	0	96.0						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 503151 (mg/L), QC Sample No: CE44714 (CE44716, CE44717)													
Ammonia as Nitrogen	BRL	0.05	0.14	0.18	NC	101			90.9			90 - 110	20
QA/QC Batch 502578 (mg/L), QC Sample No: CE44718 (CE44718)													
Chlorine Residual	BRL	0.02	<0.02	<0.02	NC	107							

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference
LCS - Laboratory Control Sample
LCSD - Laboratory Control Sample Duplicate
MS - Matrix Spike
MS Dup - Matrix Spike Duplicate
NC - No Criteria
Intf - Interference


Phyllis Shiller, Laboratory Director
October 25, 2019

Friday, October 25, 2019

Criteria: None

State: MA

Sample Criteria Exceedances Report

GCE44716 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
*** No Data to Display ***								

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedances. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedance information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Comments

October 25, 2019

SDG I.D.: GCE44716

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.



Monday, October 28, 2019

**Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040**

**Project ID: PINE BROOK COUNTRY CLUB
SDG ID: GCE46543
Sample ID#s: CE46543 - CE46545**

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

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Sincerely yours,

A handwritten signature in cursive script, appearing to read "Phyllis Shiller".

Phyllis Shiller

Laboratory Director

**NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B**

**NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301**

**587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Telephone (860) 645-1102 Fax (860) 645-0823**



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 28, 2019

SDG I.D.: GCE46543

Project ID: PINE BROOK COUNTRY CLUB

Client Id	Lab Id	Matrix
EFFLUENT-2 C39-3922	CE46543	WASTE WATER
RECEIVING WATER-2 C39-3923	CE46544	WATER
EFFLUENT GRAB-2	CE46545	WASTE WATER



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 28, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: CP
Analyzed by: see "By" below

Date Time

10/23/19 8:30
10/23/19 16:32

Laboratory Data

SDG ID: GCE46543
Phoenix ID: CE46543

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFFLUENT-2 C39-3922

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Ammonia as Nitrogen	0.08	0.05	mg/L	1	10/26/19	KDB	E350.1

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

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The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 28, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 28, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: CP
Analyzed by: see "By" below

Date Time

10/23/19 9:00
10/23/19 16:32

Laboratory Data

SDG ID: GCE46543
Phoenix ID: CE46544

Project ID: PINE BROOK COUNTRY CLUB
Client ID: RECEIVING WATER-2 C39-3923

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Ammonia as Nitrogen	0.14	0.05	mg/L	1	10/26/19	KDB	E350.1

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 28, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 28, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: CP
Analyzed by: see "By" below

Date Time

10/23/19 8:41
10/23/19 16:32

Laboratory Data

SDG ID: GCE46543
Phoenix ID: CE46545

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFFLUENT GRAB-2

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	10/23/19 18:54	O	SM4500CLG-97
pH	7.19	1.00	pH Units	1	10/24/19 00:39	AP/KDB	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 28, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 28, 2019

QA/QC Data

SDG I.D.: GCE46543

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 503046 (pH), QC Sample No: CE46275 (CE46545)													
pH			7.66	7.66	0	97.9						85 - 115	20
QA/QC Batch 503333 (mg/L), QC Sample No: CE46177 (CE46543, CE46544)													
Ammonia as Nitrogen	BRL	0.05	0.10	0.18	NC	98.1			98.0			90 - 110	20
QA/QC Batch 502998 (mg/L), QC Sample No: CE45856 (CE46545)													
Chlorine Residual	BRL	0.02	<0.02	<0.02	NC	102							

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference

LCS - Laboratory Control Sample

LCSD - Laboratory Control Sample Duplicate

MS - Matrix Spike

MS Dup - Matrix Spike Duplicate

NC - No Criteria

Intf - Interference

Phyllis Shiller, Laboratory Director
October 28, 2019

Monday, October 28, 2019

Criteria: None

State: CT

Sample Criteria Exceedances Report

GCE46543 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
*** No Data to Display ***								

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedances. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedance information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



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Analysis Comments

October 28, 2019

SDG I.D.: GCE46543

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.



CHAIN OF CUSTODY RECORD

587 East Middle Turnpike, P.O. Box 370, Manchester, CT 06040
Email: service@phoenixlabs.com Fax (860) 645-0823

Customer: New England Bioassay

Address: 77 Batson Drive

Manchester, CT 06042

Client Services (860) 645-8726

Project: Pine Brook Country Club

Report to: Kim Willis

Invoice to: Kim Willis

Project P.O.: 22610

Phone #: 860-643-9560

Fax #: 860-646-7169

Data Delivery (check one):

☐ Fax #
☒ Email: kimberly.wills@gza.com

Temp. of Pg. of

Format: ☐ Excel ☐ Pdf ☐ Gis Key

Client Sample - Information - Identification

Sampler's Signature

Date

Matrix Code:

DW=drinking water

GW=groundwater

WW=wastewater

SL=sludge

A=air

S=soil/solid O=other

Customer Sample Identification

Sample Matrix

Date Sampled

Time Sampled

Phoenix Sample #

410543

410544

410545

Analysis Request

Ammonia (0.1 mol)

Total Residual Chlorine (0.02 mol)

pH (-)

Soil VOA Vials (methanol) (Sod Bottle)

GL Soil container (oz)

PL As is 250 ml

GL Amber 250ml (As is) (H2SO4)

PL As is 100ml

PL H2SO4 (X) (250ml) (1000ml)

PL HNO3 (250ml) (1000ml)

Barium Bottle

Relinquished by:

Accepted by:

Date:

Time:

Turnaround:

Requirements for CI

Requirements for MA

1 Day*

2 Days*

3 Days*

Standard

Other

Res. Criteria

GW Protection

GA Mobility

GB Mobility

SW Protection

Res. Vol.

Ind. Vol.

MCP Certification

Other

Please see detection limits (MLs) listed next to each parameter above

Please CC: Melanie.Cruff@gza.com and Robin.Faulk@gza.com on reports



Thursday, October 31, 2019

Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Project ID: PINE BROOK COUNTRY CLUB
SDG ID: GCE48231
Sample ID#s: CE48231 - CE48233

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Phyllis Shiller".

Phyllis/Shiller

Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

October 31, 2019

SDG I.D.: GCE48231

Project ID: PINE BROOK COUNTRY CLUB

Client Id	Lab Id	Matrix
EFFLUENT 3 C39-3948	CE48231	WASTE WATER
RECEIVING WATER 3 C39-3949	CE48232	WATER
EFFLUENT GRAB 3	CE48233	WASTE WATER



Environmental Laboratories, Inc.

587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 31, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: B
Analyzed by: see "By" below

Date Time

10/25/19 7:03
10/25/19 15:06

Laboratory Data

SDG ID: GCE48231
Phoenix ID: CE48231

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFFLUENT 3 C39-3948

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Ammonia as Nitrogen	0.27	0.10	mg/L	2	10/30/19	KDB	E350.1

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 31, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 31, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: B
Analyzed by: see "By" below

Date Time

10/25/19 7:47
10/25/19 15:06

Laboratory Data

SDG ID: GCE48231
Phoenix ID: CE48232

Project ID: PINE BROOK COUNTRY CLUB
Client ID: RECEIVING WATER 3 C39-3949

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Ammonia as Nitrogen	0.08	0.05	mg/L	1	10/30/19	KDB	E350.1

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200.
The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 31, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

October 31, 2019

FOR: Attn: Ms. Kim Wills
New England Bioassay
a Division of GZA GeoEnvironmental
77 Batson Drive
Manchester, CT 06040

Sample Information

Matrix: WASTE WATER
Location Code: NEB
Rush Request: Standard
P.O.#: 22610

Custody Information

Collected by:
Received by: B
Analyzed by: see "By" below

Date Time

10/25/19 7:04
10/25/19 15:06

Laboratory Data

SDG ID: GCE48231
Phoenix ID: CE48233

Project ID: PINE BROOK COUNTRY CLUB
Client ID: EFFLUENT GRAB 3

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Chlorine Residual	< 0.02	0.02	mg/L	1	10/25/19 18:08	O	SM4500CLG-97
pH	7.60	1.00	pH Units	1	10/26/19 00:39	AP/KDB	SM4500-H B-11

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

The regulatory hold time for pH is immediately. This pH was performed in the laboratory and may be considered outside of hold-time.

The regulatory hold time for Chlorine is immediately. This Chlorine was performed in the laboratory and may be considered outside of hold-time.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

October 31, 2019

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

October 31, 2019

QA/QC Data

SDG I.D.: GCE48231

Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 503450 (pH), QC Sample No: CE48016 (CE48233)													
pH			7.09	7.14	0.70	97.3						85 - 115	20
Comment:													
Additional: LCS acceptance range is 85-115% MS acceptance range 75-125%.													
QA/QC Batch 503873 (mg/L), QC Sample No: CE48231 (CE48231, CE48232)													
Ammonia as Nitrogen	BRL	0.05	0.27	0.35	25.8	97.2			92.2			90 - 110	20
QA/QC Batch 503409 (mg/L), QC Sample No: CE47881 (CE48233)													
Chlorine Residual	BRL	0.02	<0.02	<0.02	NC	105							

r = This parameter is outside laboratory RPD specified recovery limits.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

RPD - Relative Percent Difference

LCS - Laboratory Control Sample

LCSD - Laboratory Control Sample Duplicate

MS - Matrix Spike

MS Dup - Matrix Spike Duplicate

NC - No Criteria

Intf - Interference

Phyllis Shiller, Laboratory Director
October 31, 2019

Thursday, October 31, 2019

Criteria: None

State: MA

Sample Criteria Exceedances Report

GCE48231 - NEB

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
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*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedances. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedance information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



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Analysis Comments

October 31, 2019

SDG I.D.: GCE48231

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

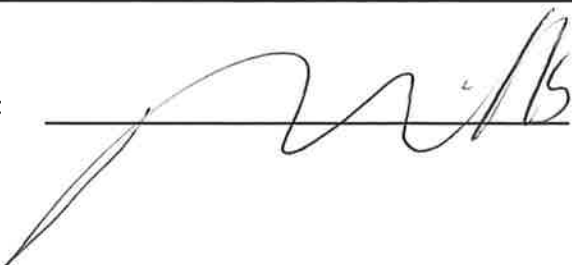
SAMPLE RECEIPT CHEMISTRY & CHAIN OF CUSTODY DOCUMENTS

NEW ENGLAND BIOASSAY - INITIAL CHEMISTRY DATA

PERMITTEE: Pine Brook Country Club
NEB JOB # 05.0752101.00

DATE RECEIVED	10/21/19		10/23/19		10/25/19	
SAMPLE TYPE:	EFF #1	BROOK #1	EFF #2	BROOK #2	EFF #3	BROOK #3
COC #	C39-3895	C39-3896	C39-3922	C39-3923	C39-3948	C39-3949
pH (SU)	7.1	6.9	7.2	7.1	7.3	7.2
Temperature (°C)	4.8	4.3	3.8	3.6	3.3, 4.2	6.1
Dissolved Oxygen (mg/L)	8.6	10.6	9.8	10.3	8.1	9.6
Conductivity (µmhos)	900	360	882	323	828	354
Salinity (ppt)	<1	<1	<1	<1	<1	<1
TRC - DPD (mg/L)	0.008	0.007	0.010	0.004	0.007	0.010
TRC - Amperometric (mg/L)	N/A	N/A	N/A	N/A	N/A	N/A
Hardness (mg/L as CaCO ₃)	104	56	104	56	102	58
Alkalinity (mg/l as CaCO ₃)	55	35	45	30	55	35
Tech Initials	CH	CH	KO	KO	CH	CH

NOTE: NA = NOT APPLICABLE

Data Reviewed By:  Date Reviewed: 11/13/19

EFFLUENT

Sample Set #1
 Sampler: Steven Hansen
 Title: Operator
 Facility: Pine Brook Country Club

Sampling Method: X Composite

Sample ID: Effluent
 Start Date: 10-20-19 Time: 1353
 End Date: 10-21-19 Time: 8122

Sampling Method: X Grab (for pH and TRC only X)

Date Collected: 10-21-19
 Time Collected: 8131

Sample Type: Prechlorinated
Dechlorinated
X Unchlorinated
Chlorinated

Effluent Sampling Location and Procedures:

Composite sampler after filter before UV

Receiving Water Sampling Location and Procedures:

Pine brook 10' upstream of outfall

Requested Analysis: X Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By: <u>[Signature]</u>	Date: <u>10-21-19</u>	Time: <u>9:44</u>
Received By: <u>[Signature]</u>	Date: <u>10-21-19</u>	Time: <u>0944</u>
Relinquished By: <u>[Signature]</u>	Date: <u>10-21-19</u>	Time: <u>1123</u>
Received By: <u>[Signature]</u>	Date: <u>10/21/19</u>	Time: <u>1123</u>

Optional Information

Purchase Order # to reference on invoice: _____

Received
ON ICE

FOR NEB USE ONLY

* Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.

Temperature of Effluent Upon Receipt at Lab: 48 °C

Temperature of Receiving Water Upon Receipt at Lab: 4.3 °C

Effluent COC# C37-3895

Receiving Water COC# C39-3896

**IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
 KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042**

NEW ENGLAND BIOASSAY- CHAIN-OF-CUSTODY

EFFLUENT

Sampler: Steven Hansen
 Title: Operator
 Facility: Pine Brook Country Club

Sampling Method: X Composite

Sample ID: Effluent
 Start Date: 10/23/19 Time: 15:01
 End Date: 10/23/19 Time: 8:30

Sampling Method: X Grab (for pH and TRC only X)

Date Collected: 10/23/19
 Time Collected: 8:41

Sample Type: Prechlorinated
Dechlorinated
X Unchlorinated
Chlorinated

Effluent Sampling Location and Procedures:

Composite sampler after filter and before UV

Receiving Water Sampling Location and Procedures:

Pine brook 10' upstream of out fall

Requested Analysis: X Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By: <u>StH Hansen</u>	Date: <u>10-23-19</u>	Time: <u>935</u>
Received By: <u>ALB</u>	Date: <u>10/23/19</u>	Time: <u>9:50</u>
Relinquished By: <u>ALB</u>	Date: <u>10/23/19</u>	Time: <u>11:35</u>
Received By: <u>James</u>	Date: <u>10/23/19</u>	Time: <u>1135</u>

Optional Information

Purchase Order # to reference on invoice: _____

Received
ON ICE

FOR NEB USE ONLY

* Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.

Temperature of Effluent Upon Receipt at Lab: 3.8 °C
 Effluent COC# 039-3922

Temperature of Receiving Water Upon Receipt at Lab: 3.6 °C
 Receiving Water COC# 039-3923

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
 KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

NEW ENGLAND BIOASSAY - CHAIN-OF-CUSTODY

EFFLUENT

Sampler: Steve Hansen
 Title: Operator
 Facility: Pine Brook Country Club

Sampling Method: ☒ Composite

Sample ID: Effluent
 Start Date: 10/24/19 Time: 17:34
 End Date: 10/25/19 Time: 7:03

Sampling Method: ☒ Grab (for pH and TRC only ☒)

Date Collected: 10-25-19
 Time Collected: 7:04

Sample Type: ☐ Prechlorinated
☐ Dechlorinated
☒ Unchlorinated
☐ Chlorinated

Effluent Sampling Location and Procedures:

Composite Sampler After Filter and before UV

Receiving Water Sampling Location and Procedures:

Grab Sample 10 FT above out fall

Requested Analysis: ☒ Chronic and modified acute

Sample Shipment

Method of Shipment: NEB Courier

Relinquished By: [Signature]

Date: 10-25-19

Time: 10:05 AM

Received By: [Signature]

Date: 10-25-19

Time: 10:05 AM

Relinquished By: [Signature]

Date: 10-25-19

Time: 11:40

Received By: [Signature]

Date: 10/25/19

Time: 1140

Optional Information

Purchase Order # to reference on invoice: _____

Received
ON ICE

FOR NEB USE ONLY

* Please return all ice packs NEB has provided to insure accurate temperature upon receipt to the NEB laboratory.

Temperature of Effluent Upon Receipt at Lab: 3.3, 4.2°C

Temperature of Receiving Water Upon Receipt at Lab: 6.1 °C

Effluent COC# C39-3948

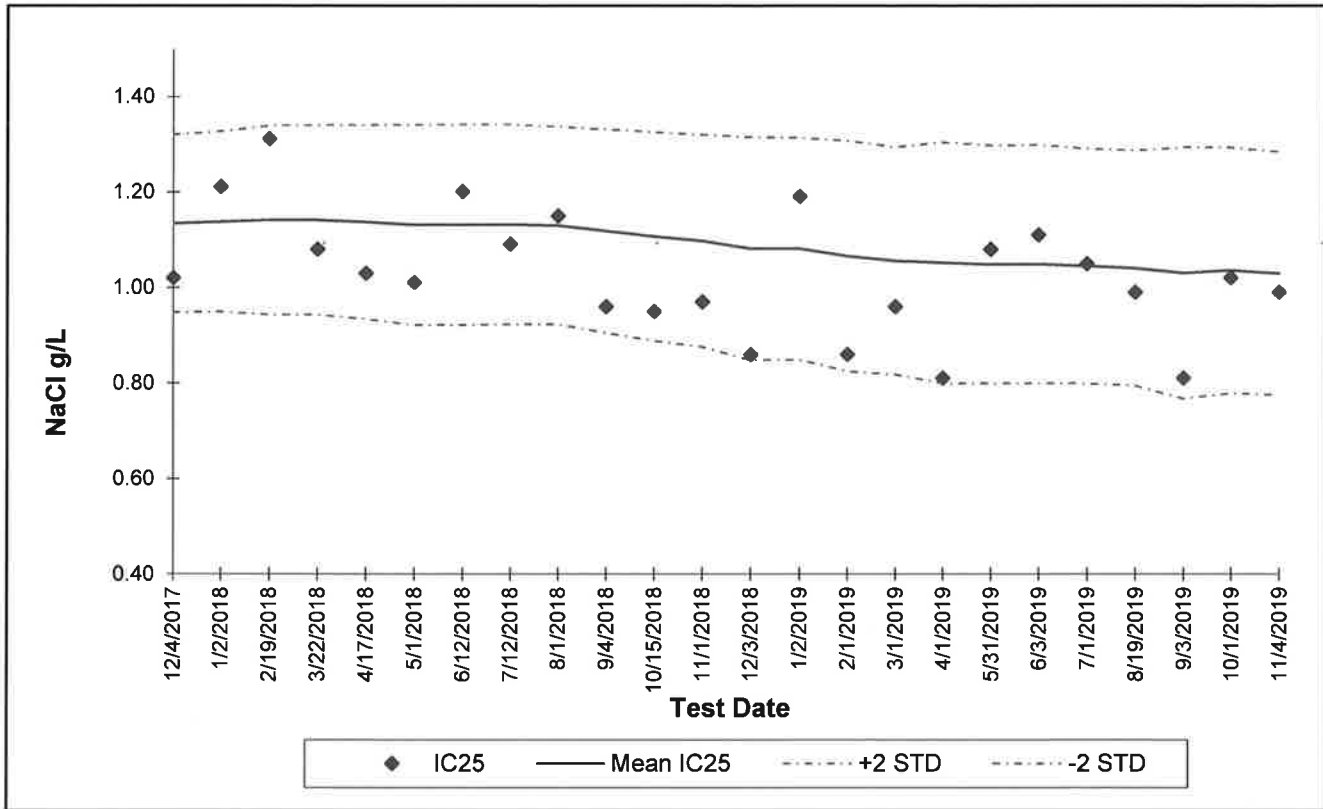
Receiving Water COC# C39-3949

IF THIS COOLER IS MISPLACED OR THE LABEL IS LOST, PLEASE SHIP TO:
 KIM WILLS, NEW ENGLAND BIOASSAY, 77 BATSON DRIVE, MANCHESTER CT 06042

REFERENCE TOXICANT CHARTS

New England Bioassay

Reference Toxicant Data: Sodium chloride (NaCl) *Ceriodaphnia dubia* Chronic Reproduction IC₂₅



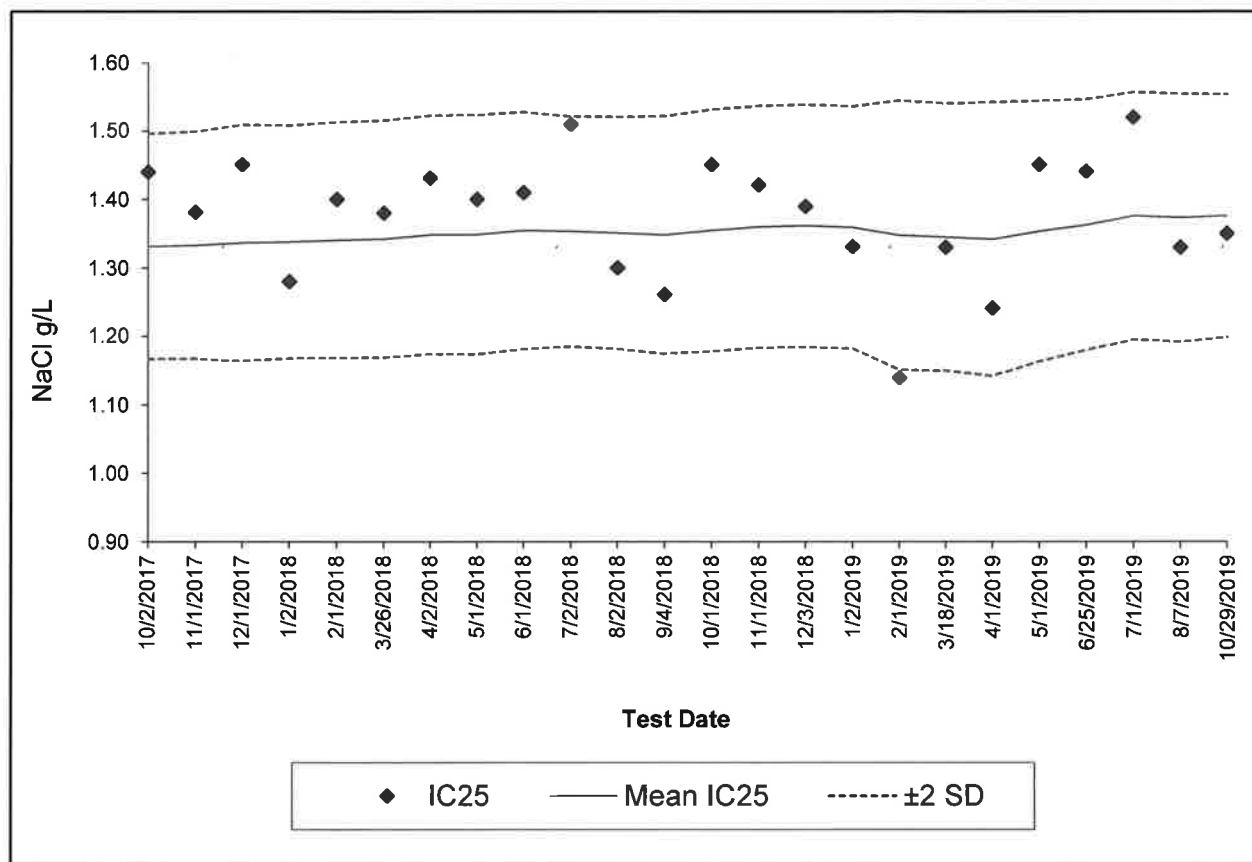
Test ID	Date	IC ₂₅	Mean IC ₂₅	STD	-2STD	+2STD	Avg. CV	Repro PMSD (%)	Avg. PMSD (%)
17-1846	12/4/2017	1.02	1.13	0.09	0.95	1.32	0.08	14.69	16.60
18-10	1/2/2018	1.21	1.14	0.09	0.95	1.33	0.08	10.81	16.36
18-271	2/19/2018	1.31	1.14	0.10	0.94	1.34	0.09	22.90	16.56
18-416	3/22/2018	1.08	1.14	0.10	0.94	1.34	0.09	17.59	16.88
18-553	4/17/2018	1.03	1.14	0.10	0.93	1.34	0.09	38.54	17.77
18-607	5/1/2018	1.01	1.13	0.10	0.92	1.34	0.09	24.65	18.25
18-816	6/12/2018	1.20	1.13	0.11	0.92	1.34	0.09	46.97	19.59
18-996	7/12/2018	1.09	1.13	0.10	0.92	1.34	0.09	11.41	19.70
18-1103	8/1/2018	1.15	1.13	0.10	0.92	1.34	0.09	17.23	19.67
18-1315	9/4/2018	0.96	1.12	0.11	0.91	1.33	0.10	22.12	20.09
18-1577	10/15/2018	0.95	1.11	0.11	0.89	1.33	0.10	24.32	20.64
18-1625	11/1/2018	0.97	1.10	0.11	0.88	1.32	0.10	31.57	21.34
18-1756	12/3/2018	0.86	1.08	0.12	0.85	1.32	0.11	15.77	21.00
19-8	1/2/2019	1.19	1.08	0.12	0.85	1.31	0.11	40.72	21.30
19-177	2/1/2019	0.86	1.07	0.12	0.82	1.31	0.11	18.71	21.63
19-265	3/1/2019	0.96	1.06	0.12	0.82	1.29	0.11	19.84	22.13
19-403	4/1/2019	0.81	1.05	0.13	0.80	1.30	0.12	10.09	21.85
19-674	5/31/2019	1.08	1.05	0.12	0.80	1.30	0.12	15.59	21.93
19-688	6/3/2019	1.11	1.05	0.12	0.80	1.30	0.12	15.24	22.23
19-926	7/1/2019	1.05	1.04	0.12	0.80	1.29	0.12	12.60	22.23
19-1154	8/19/2019	0.99	1.04	0.12	0.79	1.29	0.12	24.17	22.24
19-1226	9/3/2019	0.81	1.03	0.13	0.77	1.29	0.13	19.49	21.64
19-1396	10/1/2019	1.02	1.04	0.13	0.78	1.29	0.12	18.01	21.38
19-1560	11/4/2019	0.99	1.03	0.13	0.77	1.28	0.12	14.03	21.13

National 75th Percentile and 90th Percentile CV Averages for *Ceriodaphnia* Reproduction IC₂₅ (EPA 833-R-00-003): 0.45 - 0.62

PMSD Upper and Lower Bounds for *Ceriodaphnia* Reproduction (EPA-821-R-02-013): 13% - 47%

New England Bioassay

Reference Toxicant Data: Sodium chloride (NaCl) *Pimephales promelas* 7-day Chronic Growth IC₂₅



Test ID	Date	IC ₂₅	Mean IC ₂₅	STD	-2STD	+2STD	Avg. CV	Growth PMSD (%)	Avg. PMSD (%)
17-1522	10/2/2017	1.44	1.33	0.08	1.17	1.50	0.06	10.36	10.12
17-1696	11/1/2017	1.38	1.33	0.08	1.17	1.50	0.06	9.27	10.08
17-1809	12/1/2017	1.45	1.34	0.09	1.16	1.51	0.06	26.17	10.78
18-11	1/2/2018	1.28	1.34	0.09	1.17	1.51	0.06	6.16	10.59
18-184	2/1/2018	1.40	1.34	0.09	1.17	1.51	0.06	10.52	10.51
18-416	3/26/2018	1.38	1.34	0.09	1.17	1.51	0.06	9.14	10.49
18-472	4/2/2018	1.43	1.35	0.09	1.17	1.52	0.06	6.25	10.57
18-608	5/1/2018	1.40	1.35	0.09	1.17	1.52	0.06	11.80	10.88
18-745	6/1/2018	1.41	1.35	0.09	1.18	1.53	0.06	13.87	11.08
18-919	7/2/2018	1.51	1.35	0.08	1.19	1.52	0.06	12.86	10.83
18-1104	8/2/2018	1.30	1.35	0.08	1.18	1.52	0.06	9.21	10.63
18-1316	9/4/2018	1.26	1.35	0.09	1.18	1.52	0.06	11.89	10.84
18-1512	10/1/2018	1.45	1.36	0.09	1.18	1.53	0.06	8.61	10.76
18-1626	11/1/2018	1.42	1.36	0.09	1.18	1.54	0.06	9.48	10.87
18-1757	12/3/2018	1.39	1.36	0.09	1.18	1.54	0.06	9.70	10.95
19-9	1/2/2019	1.33	1.36	0.09	1.18	1.54	0.07	8.91	11.06
19-178	2/1/2019	1.14	1.35	0.10	1.15	1.54	0.07	6.84	10.94
19-376	3/18/2019	1.33	1.35	0.10	1.15	1.54	0.07	15.36	10.73
19-404	4/1/2019	1.24	1.34	0.10	1.14	1.54	0.07	7.57	10.73
19-541	5/1/2019	1.45	1.35	0.10	1.16	1.54	0.07	7.92	10.62
19-823	6/25/2019	1.44	1.36	0.09	1.18	1.55	0.07	10.75	10.76
19-927	7/1/2019	1.52	1.38	0.09	1.20	1.56	0.07	14.21	10.91
19-1090	8/7/2019	1.33	1.37	0.09	1.19	1.55	0.07	12.60	10.97
19-1559	10/29/2019	1.35	1.38	0.09	1.20	1.55	0.06	9.92	10.81

National 75th Percentile and 90th Percentile CV Averages for Fathead Growth IC₂₅ (EPA 833-R-00-003): 0.38 - 0.45
PMSD Upper and Lower Bounds for Fathead Growth (EPA-821-R-02-013): 12% - 30%